STATE OF MONTANA

DEPARTMENT OF REVENUE

1990 OIL AND GAS FIELD EQUIPMENT MANUAL

TREND FACTORS FOR THE OIL AND GAS MANUAL

This schedule should be used from January 1, 2006, through December 31, 2006.

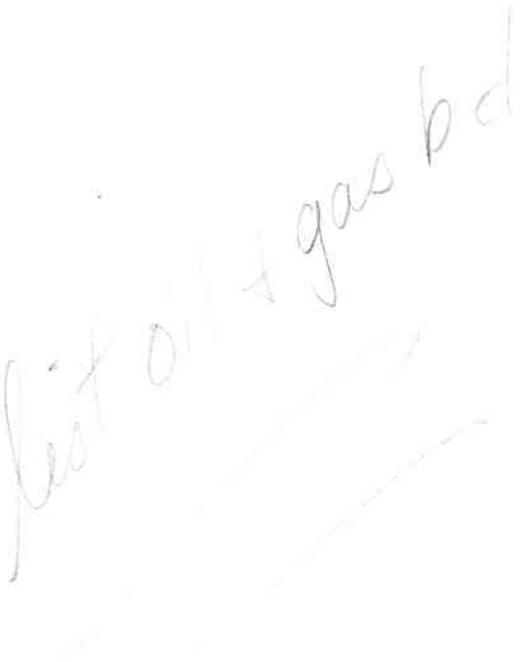
YEAR	TREND
2005	1249.2
2004	1157.7
2003	1116.6
2002	1096.6
2001	1090.6
2000	1080.3
1999	1063.0
1998	1057.8
1997	1047.0
1996	1033.9
1995	1014.0
1994	977.9
1993	958.3
1992	946.1
1991	939.1
1990	919.2
1989	895.9
1988	847.8
1987	812.8
1986	804.0
1985	800.4
1984	789.2
1983	768.8
1982	757.8
1981	720.0
1980	647.4
1979	583.7
1978	536.9
1977	498.3
1976	473.2
1975	447.6
1974	400.5
1973	341.1
1972	329.7
1971	319.1
1970	300.7
1969	282.8
1968	271.6
1967	261.9

YEAR	TREND
1966	251.5
1965	243.8
1964	241.1
1963	238.7
1962	238.0
1961	237.7
1960	239.2
1959	236.5
1958	232.3
1957	226.5
1956	209.1
1955	191.5
1954	186.2
1953	183.1
1952	181.1
1951	180.7
1950	169.6
1949	164.5
1948	164.5
1946	126.8
1944	105.6

PREFACE

This manual has been published to provide the assessors of Montana with 1989 replacement cost information of oil and gas equipment, and to assist them in making reasonable estimates of the 1990 value of such items. The manual is to be used only in the case of estimated assessments and in cases where taxpayers absolutely cannot provide acquired costs. Copies are not to be distributed to taxpayers for any reason.

The costs include item cost, freight, and typical installation charges.



SECTION I

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SECTION II

INSTRUCTIONS AND PROCEDURES

INSTRUCTIONS AND PROCEDURES

This manual contains 1989 replacement costs to assist the assessor in determining the 1990 level of value of oil and gas equipment for estimated assessments.

PROCEDURE

Physical Inventory by the Assessor For Estimated Assessments

The assessor should implement a program for the physical inspection and listing of all oil and gas equipment in the county. This will enable him to compare the itemized listings returned by operators with the physical inventory obtained by field inspection, determine the items missing from incomplete declarations, estimate the age and condition of the equipment, and become more familiar with the equipment in the county's oil and gas fields.

Before making a physical inspection and listing of the equipment, the assessor should contact someone with authority in the particular lease, such as the operator, production foreman, head roustabout, pumper, etc. These people are then aware that the assessor will be on the lease taking inventory. They are usually cooperative in furnishing information about ownership, age, condition, etc., and will sometimes personally assist the assessor in his inventory work.

At the time of the inspection, the assessor should list the following facts for each item of equipment:

a. Type of equipment, such as surface pumping unit, separator, treater, gas production unit, bolted tank, etc.

b. Make, model and description, including size, diameter, height, etc., or any other information necessary to adequately describe the particular item.

c. Year manufactured or estimated age.

d. Condition of the item of equipment, if possible to ascertain.

e. Ownership.

When oil and gas equipment is found which is owned by a state assessed utility, such equipment should be listed and its ownership noted. A determination can be made later as to whether this

equipment should be assessed locally or by the state.

It is recommended that while making the physical inspection, the assessor should take suitable pictures of the equipment and draw a sketch showing the relative position of the items.

B. DETERMINATION OF REPLACEMENT COST NEW

1. The Oil and Gas Equipment Manual Costs Should Be Used As A Supplement To The Taxpayers Report only in the case of estimated assessments.

   Experience with oil and gas equipment indicates that current accounting records of this equipment are sometimes not available, and that some of the costs related to equipment are not capitalized as they are considered intangible by the operator.

   Quite often, in the case of new oil and gas equipment, identical items may be purchased by different users, none of whom pay exactly the same price. This is due to financial position of the buyer or seller, ability to negotiate, supply and demand situation at the moment, and other factors.

   If the exact model and size is not listed in this manual, but a comparable model or size is listed, use the manual R.C.N. for the comparable model or size. For example one may find on a lease a vertical treater, which is 48" x 22.5'. The manual does not list this size. In this case, one would use the manual R.C.N. for a vertical treater which is 48" x 20'.

SECTION III

DOWN-HOLE WELL EQUIPMENT

DOWN-HOLE WELL EQUIPMENT

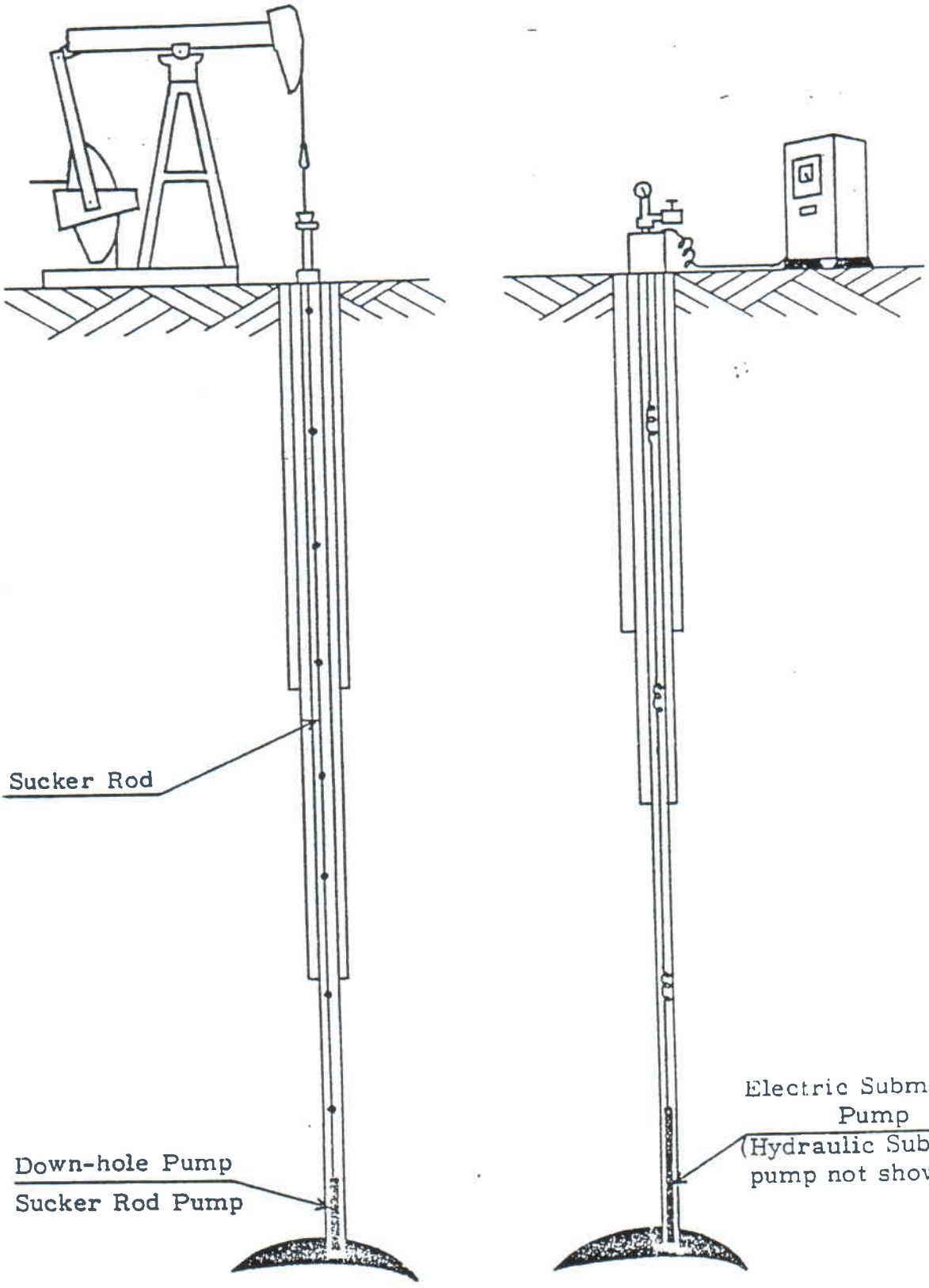
Down-hole well equipment is exempt from taxation.

"Down-hole" equipment is considered to be all of the equipment located in the drilled hole below the well head.

Down-hole equipment includes down-hole pumps, tubing and sucker rods and the equipment in a shut-in or capped well.

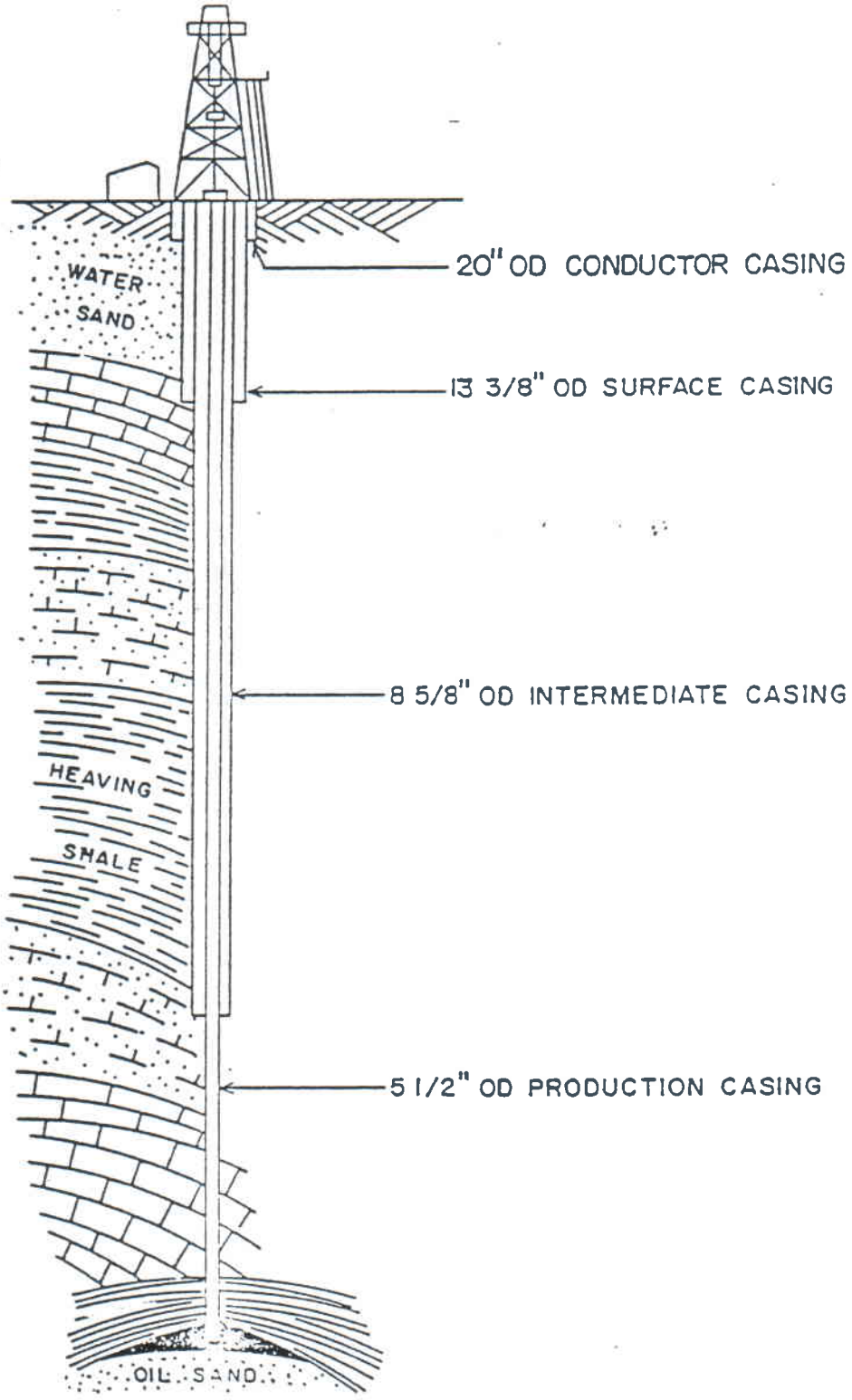
If the down-hole equipment is not in the drilled hole, it is a supply item and subject to taxation.

DOWN-HOLE WELL EQUIPMENT



SEPARATELY ASSESSABLE DOWN-HOLE EQUIPMENT

DOWN-HOLE WELL EQUIPMENT



RELATIONSHIP OF STRINGS OF CASING

SECTION IV

IN-PLACE UNIT COSTS

IN-PLACE UNIT COSTS

This section contains in-place unit costs on typical oil and gas field items. Each item is numbered in a logical sequence to assist the assessor in his inventory and computation process.

If items not listed in this manual are encountered, the Appraisal/Assessment Bureau should be contacted for the specific costs.

Data to be forwarded to the assessor should include make, model, serial number, capacity description and all pertinent information listed on the identification plate.

IN-PLACE UNIT COSTS

1. DOWN-HOLE WELL EQUIPMENT

Listed below are both noninstalled and installed costs of down-hole well equipment. The first table would be used in valuing this equipment in storage yards.

A. CASING (When Stored Only)

	O.D. Size	Grade	Not Installed (Supplies)
1.	4-1/2"	K-55	$ 6.38
2.	5-1/2"	K-55	8.70
3.	7"	K-55	12.78
4.	7-5/8"	K-55	14.31
5.	8-5/8"	K-55	17.39
6.	9-5/8"	K-55	20.28
7.	10-3/4"	K-55	23.95
8.	13-3/8"	K-55	33.24

C. TUBING (When Stored Only)

1.	2-3/8"	J-55	$ 3.31
2.	2-7/8"	J-55	4.26

D. SUCKER ROD (when stored only)

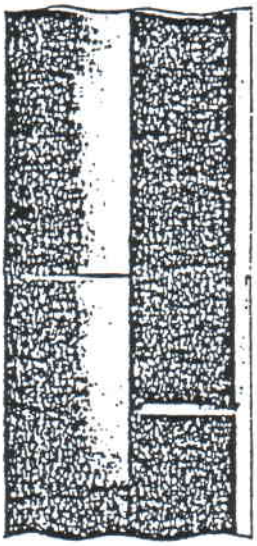
1.	5/8"	$ 1.25
2.	3/4"	1.65
3.	7/8"	2.12
4.	1"	3.08

E. DOWN-HOLD PUMP (when stored only)

(also known as bottom hold pump or sucker rod pump)

1.	Average R.C.N.	$1,550

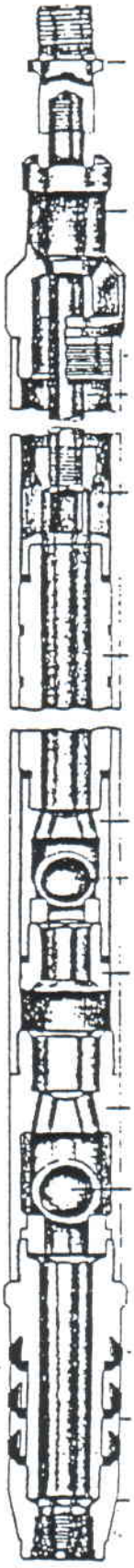
DOWN-HOLE WELL EQUIPMENT



CASING

SUCKER ROD

TUBING



DOWN-HOLE PUMP

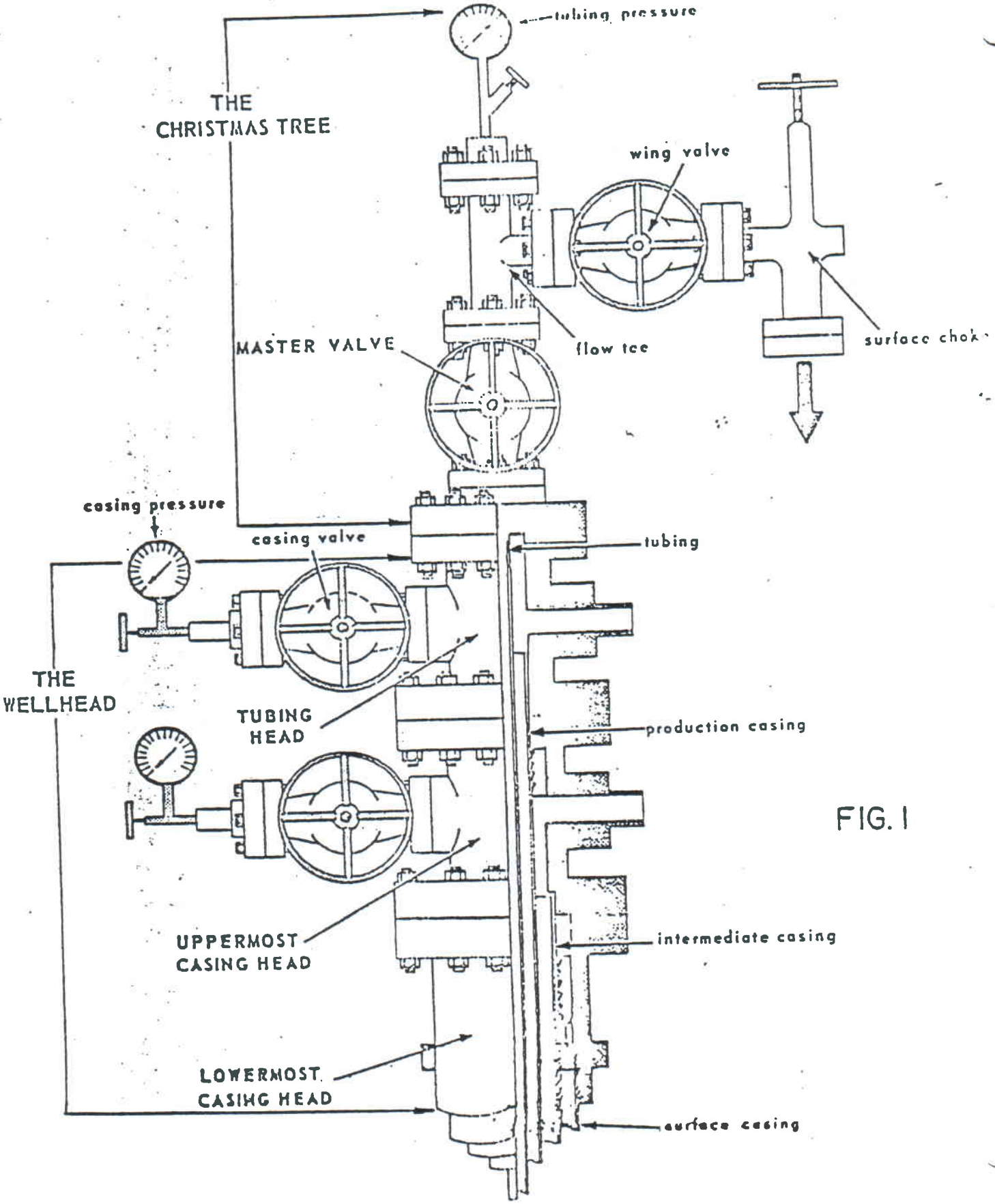


FIG. 1

DIAGRAM OF A WELL HEAD

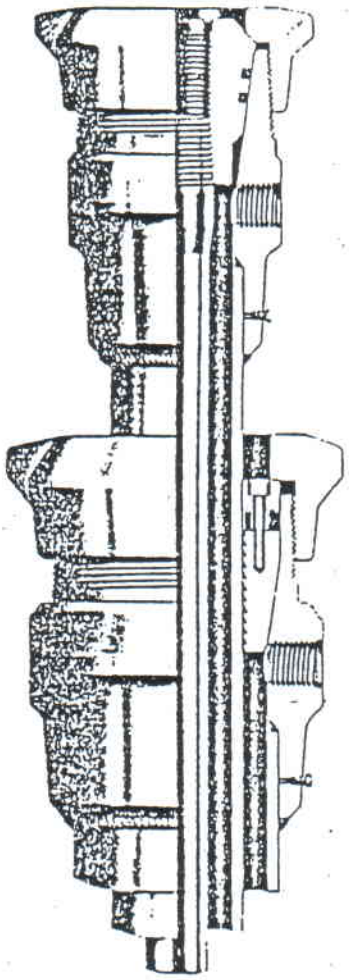


Fig. 2

Threaded or
screw on type

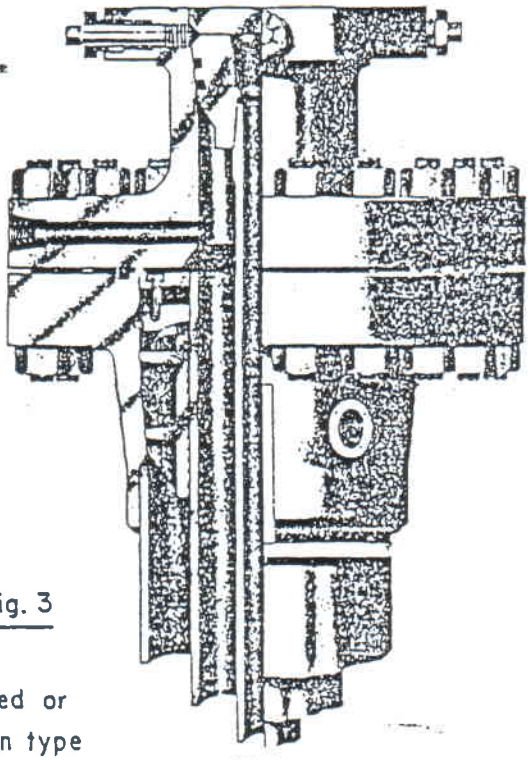


Fig. 3

Flanged or
bolt on type

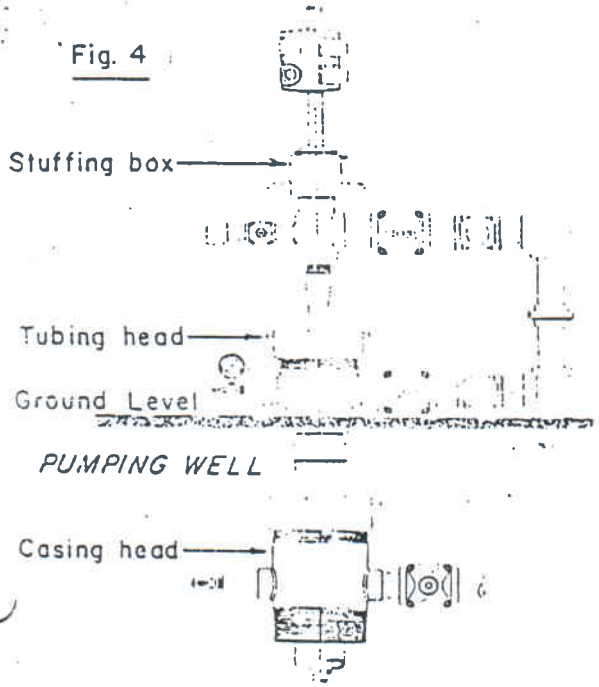


Fig. 4

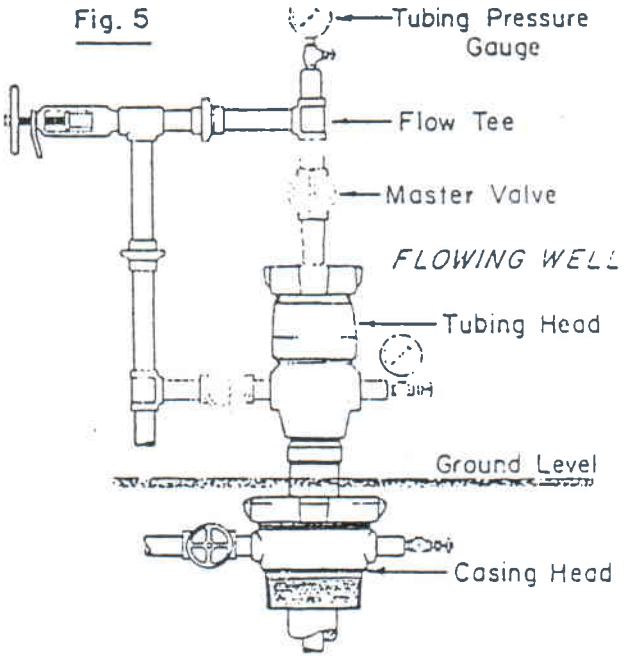


Fig. 5

TYPICAL WELL HEAD ASSEMBLIES

IN-PLACE UNIT COSTS

2. WELL HEAD EQUIPMENT

The well head is the equipment used to maintain surface control of the well. It is comprised of combinations of parts called the casing head, tubing head, Christmas tree, stuffing box, and pressure gauges. See Figure 1, Page 4. Part of the well head equipment is usually located below the surface of the ground so it will not be seen during a physical inspection.

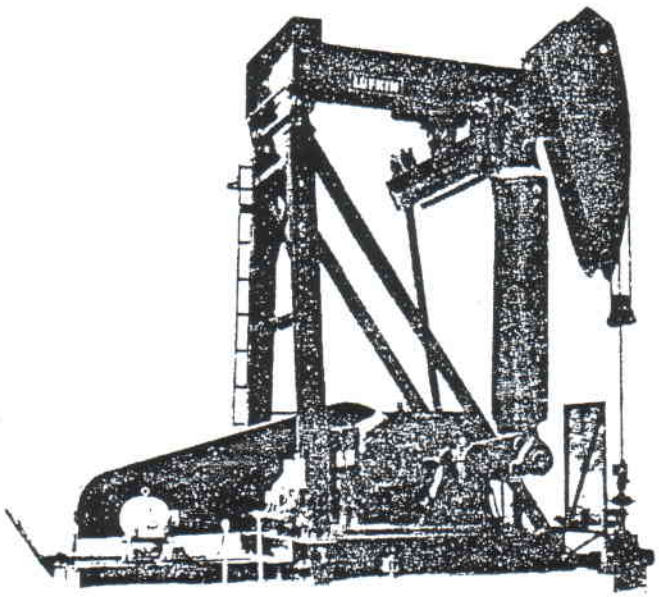
Well heads will be either the threaded type or flanged type, as illustrated in Figures 2 and 3, Page 5. The Christmas tree components are different for a gas well than for a pumping oil well. See Figure 4 and 5, Page 5. Cost is related to pressure; i.e., the higher the pressure encountered, the higher the cost of the well head equipment.

Well head equipment listed here is representative of most well head installations. It is designed for surface casing up to 8-5/8", production casing up to 5-1/2", and tubing up to 2-7/8". The replacement costs new vary as to whether the well head is for a pumping or free flowing well, whether it is the threaded or flanged type, and according to the pressure rating.

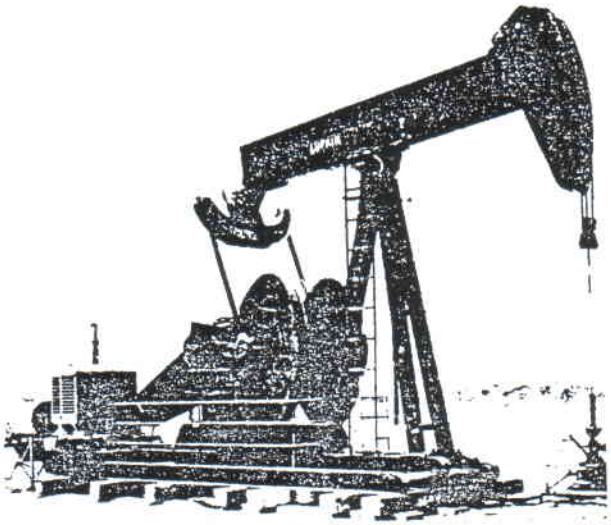
	Type Well	Pressure Rating (Lbs.) Type Head	Working	Test	R.C.N.
A.	Pumping	Threaded	Up to 2,000	4,000	$ 3,579
B.	Pumping	Flanged	2,000	4,000	7,736
C.	Pumping	Flanged	3,000	6,000	13,538
D.	Gas or flowing	Threaded	Up to 2,000	4,000	3,869
E.	Gas or flowing	Flanged	2,000	4,000	8,896
F.	Gas or flowing	Flanged	3,000	6,000	14,503
G.	Gas or flowing	Flanged	5,000	10,000	25,107

estimate wellhead as a total - hard to get parts usually listed as / unit.
2 range of $$

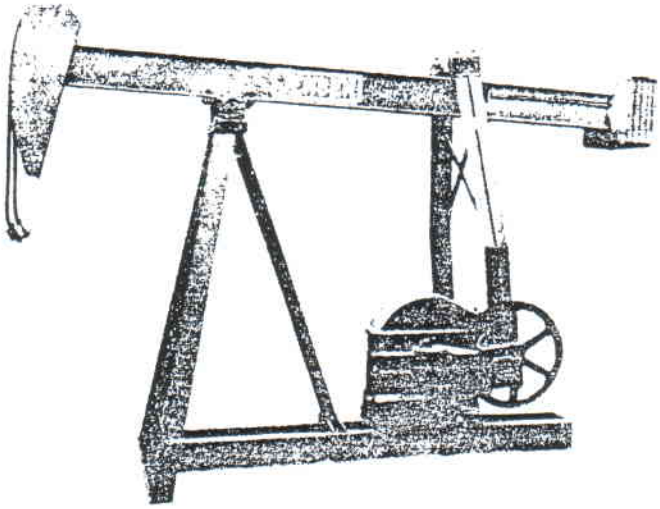
SURFACE PUMPING UNITS



LARGE



MEDIUM



SMALL

IN-PLACE UNIT COSTS

3. SURFACE PUMPING UNITS

Installed pumping unit costs include pumping unit complete with portable base, drive accessories, foundation bolts, center line hold-downs, crank and belt guard, and gas engine or electric motor.

Listed below are both noninstalled pump costs and installed pump costs complete with engine or motor. The first table would be used in valuing pumps in storage yards.

update

	Model Designation	Pump Only	Installed Pump With Gas Engine	R.C.N. Pump With Elec. Motor
A.	3, 6, 4 or 5	$ 1,550	$ 2,378	$ 2,224
B.	6 or 6.4	1,933	2,768	2,556
C.	10	2,318	3,407	2,999
D.	16	3,579	4,839	4,257
E.	25	4,354	5,879	5,223
F.	40	8,026	10,781	9,629
G.	50	6,187	8,357	7,447
H.	57	9,286	12,900	11,042
I.	80	15,278	19,427	18,181
J.	114	22,629	30,561	25,126
K.	160	28,526	39,942	32,802
L.	228	35,777	47,578	42,591
M.	320	41,970	57,053	49,358
N.	456	51,251	69,202	60,477
O.	640	57,638	80,687	65,121
P.	912*	61,889	102,584	75,737
Q.	1280*	81,232	121,037	99,952
R.	1824*	92,836	140,046	116,336

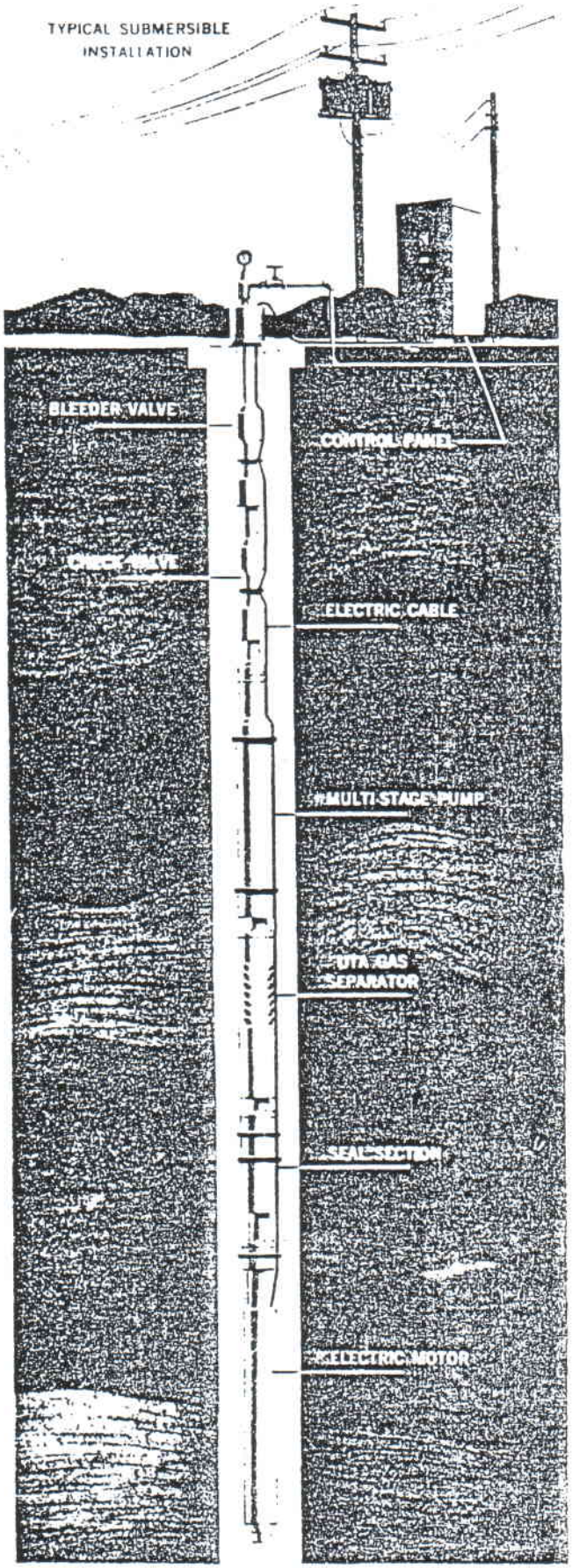
150K – 300K new

*These units are air balanced.

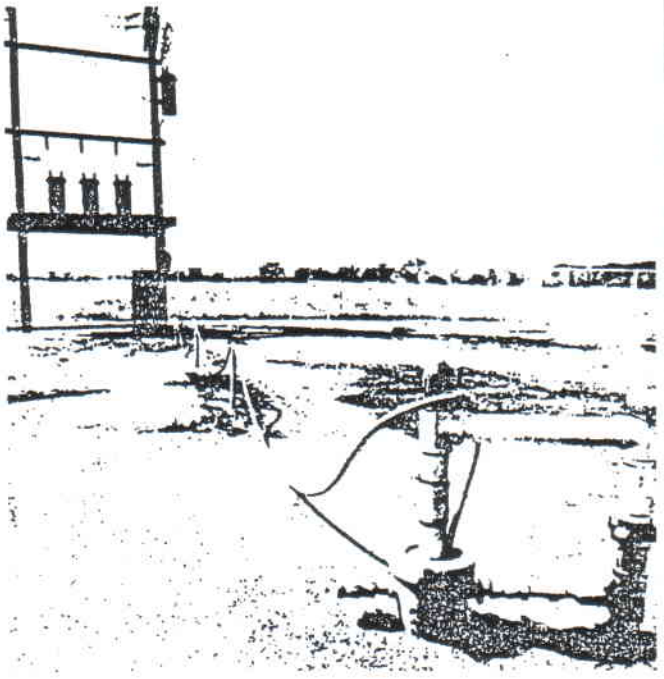
The above units are not used in cases of flowing wells, or where a submersible electric or hydraulic pump is used.

The model of the pumping unit can usually be found on the identification or specification plate. Older pumping units may have model designations different from those listed above. In such cases, the assessor should look for a metal tag on the pump gear housing which lists the gear reducer torque rating. This torque rating, listed in thousands of pounds, should correspond to one of the above model designations. For example, a gear reducer torque rating of 114,000 lbs. corresponds to a Model 114 pumping unit.

SUBMERSIBLE ELECTRIC PUMPS



better pic



TYPICAL SURFACE EQUIPMENT NECESSARY FOR A SUBMERSIBLE ELECTRIC PUMP

IN-PLACE UNIT COSTS

4. SUBMERSIBLE ELECTRIC PUMP UNITS (Shut in Wells Only)

Submersible electric pump units provide an efficient means of lifting large volumes of fluid. For this reason, they often replace beam type surface pumping units in secondary recovery water flood operations.

Five basic elements form this unit. (1) An electric motor, (2) centrifugal pump, and (3) protector section comprise the down-hole section. These elements are connected to (4) a control panel on the surface by (5) an electric cable. These basic elements are supplemented by transformers and miscellaneous accessories. A typical installation is shown on page 9.

In its operating position, the down-hole section is usually suspended on tubing and submerged in the well fluid.

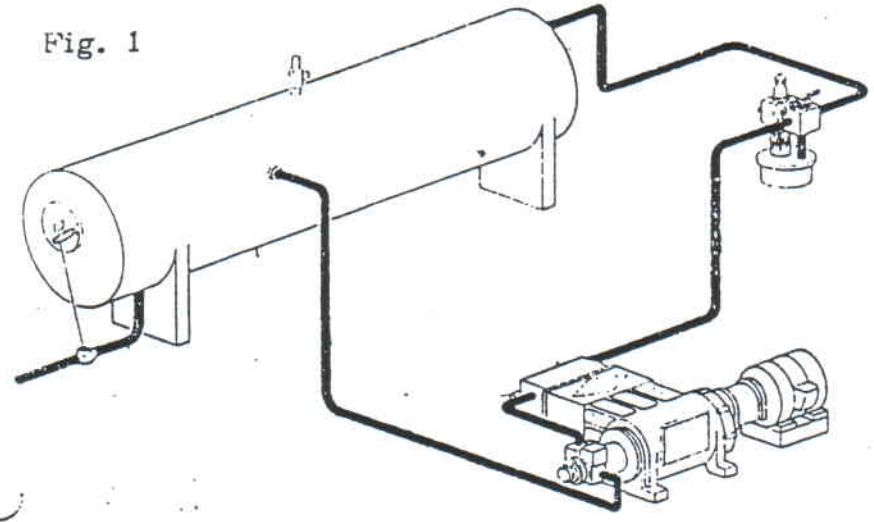
The replacement cost per horsepower chart below may be used as an approximate guide when original costs are not available, or for comparison purposes once the original installed cost and horsepower rating of the electric motor have been obtained. Costs are for the complete pump unit including transformers, but do not include well head or electric power to the site.

	Electric Motor Horsepower Range	R.C.N. Per H.P.
A.	Up to 40 H.P.	$1,260
B.	41 - 70 H.P.	964
C.	71 - 100 H.P.	775
D.	101 - 150 H.P.	580
E.	151 - 600 H.P.	331
F.	601 - 1050 H.P.	230

HYDRAULIC PUMPING SYSTEMS

INDIVIDUAL WELL SYSTEM

Fig. 1



BOTTOM HOLE HYDRAULIC PUMP

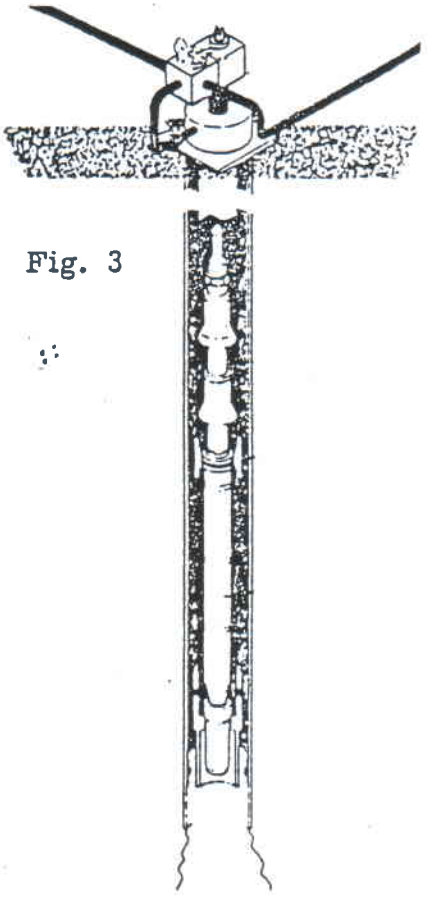
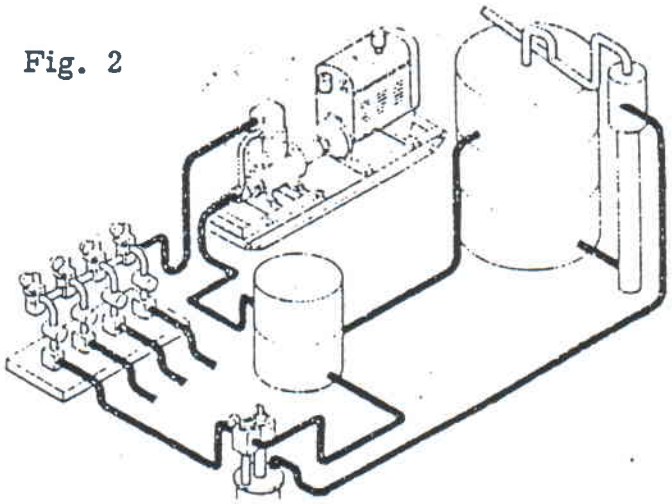


Fig. 3

MULTIPLE WELL SYSTEM

Fig. 2



IN-PLACE UNIT COSTS

5. SUBSURFACE HYDRAULIC PUMPING SYSTEMS

These systems use oil under pressure as a source of power to operate a hydraulic bottom hold pump. Power oil is pumped down a string of tubing to actuate the pump which delivers the crude oil from the producing formation along with the power oil to another string of tubing that carries both fluids to the surface. This type system may be used for individual wells or to pump several wells from a central source.

A hydraulic oil well pumping system consists of the following components:

A. A tank or tanks for the power fluid oil.

B. The prime mover which will be a gas engine or an electric motor which powers the high pressure surface pump.

C. The high pressure surface pump (usually a triplex pump).

D. The control station or manifold which directs power fluid to the various wells and controls the pump speed for each well.

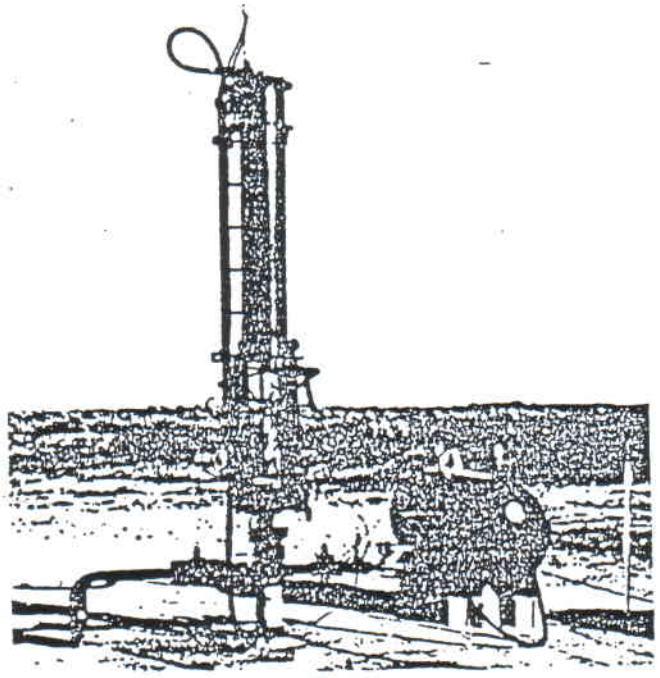
E. Special well head valving.

F. The bottom hole hydraulic pump.

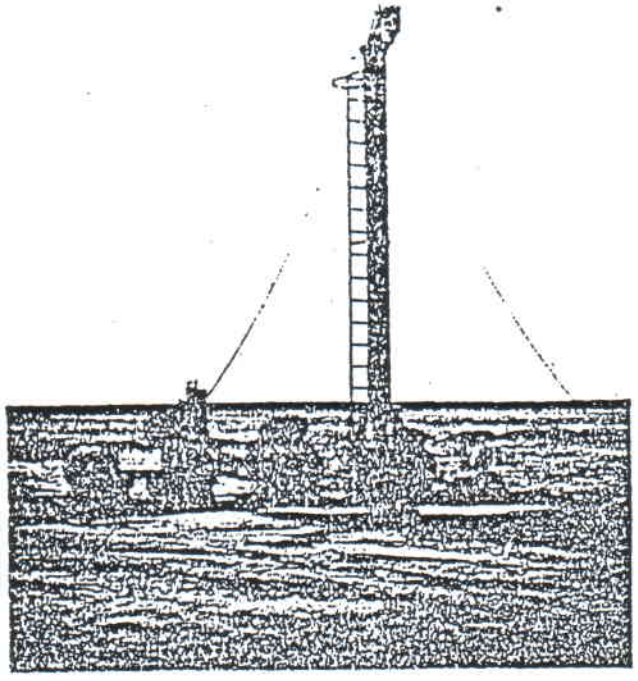
G. Additional down-hole equipment including an extra string of tubing may or may not be necessary depending on the down-hole system being used.

Most 1989 installations of individual well (not multiple well) hydraulic pumping systems ranged from $87,630 to $165,523.

PNEUMATIC SURFACE PUMPING UNITS



SYSTEM USING WELL HEAD GAS



SYSTEM USING AUXILIARY COMPRESSOR

IN-PLACE UNIT COSTS

6. PNEUMATIC SURFACE PUMPING UNITS

These are relatively low cost pneumatically activated pumping systems. The unit is basically a vertical pneumatic cylinder mounted rigidly to the well head. It utilizes air or gas pressure acting on a piston inside the cylinder to impart movement of the sucker rod string. These units are used for dewatering gas wells as well as pumping oil wells.

If sufficient well head or lease gas is available, the unit is usually powered by such gas. The system consists of the pumping unit and a gas reservoir tank as shown in the upper picture on page 13.

When sufficient natural gas is not available, an auxiliary compressor is used to provide the pneumatic pressure required. Such a system consists of the pumping unit,one or more compressors and two or more reservoir tanks, as is illustrated in the lower picture on page 13.

To determine the total R.C.N. of a pneumatic pumping system, add the R.C.N. of the pumping unit, and the R.C.N. of the appropriate tanks.

A. Pneumatic Pumping Units

	Cyl. Stroke		Cyl. Bore	Installed R.C.N.
1.	3'	x	8" or 11 1/2"	$11,990
2.	4'	x	8" or 11 1/2"	12,569
3.	5'	x	8" or 11 1/2"	12,090
4.	7'	x	8" or 11 1/2"	15,567
5.	10'	x	8"	12,475
6.	10'	x	11 1/2	16,248
7.	15'	x	11 1/2"	19,247

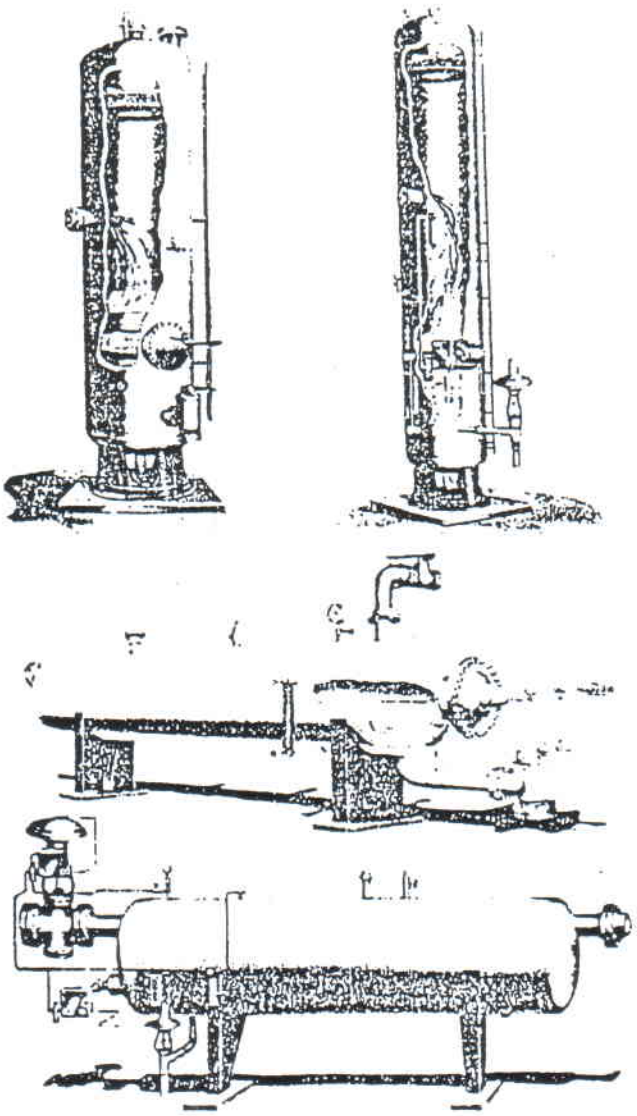
B. Tanks

	PSI	Cap. Cu. Ft.	R.C.N.
1.	200	16	$ 674
2.	200	32	1,065
3.	267	32	1,644
4.	300	32	1,644

C. Compressors

Note: When auxiliary compressors are encountered, cost of compressors must be obtained locally or from the operator.

SEPARATORS



IN-PLACE UNIT COSTS

7. SEPARATORS

The function of a separator is to separate natural gas from crude oil. Vertical separators are generally used when the major production of a well is oil, whereas horizontal separators are generally used when the major production of a well is natural gas. Separators do not have burners. Costs include all necessary controls, gauges, valves and piping.

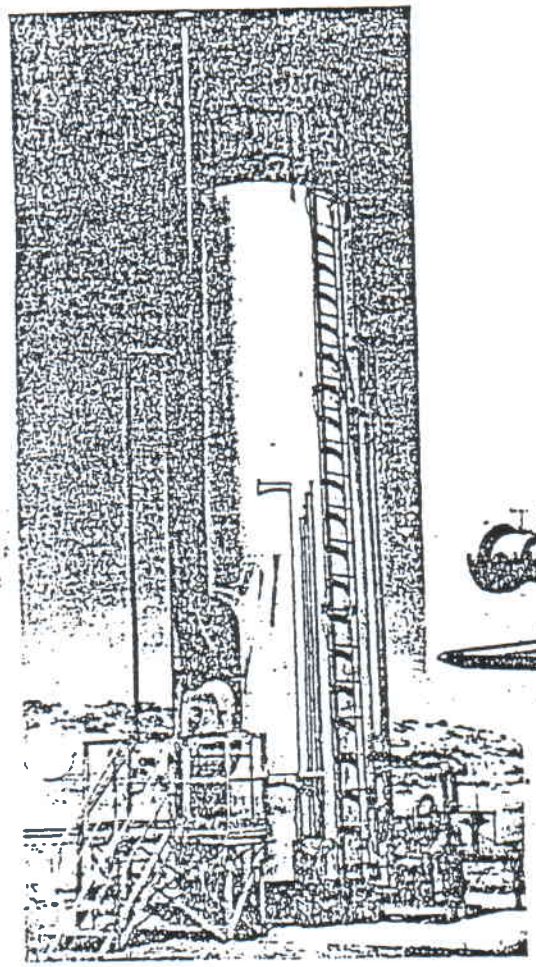
	Size	Type	PSI	Ph	Separator Cost Only	Installed Cost
A.	16' x 5'	Vertical	500	3	$ 4,643	$ 5,069
B.	24" x 5'	Vertical	125	2	3,094	3,749
C.	24" x 5'	Vertical	250-500	1	4,643	5,300
D.	24" x 7.5'	Vertical	500	3	6,962	7,931
E.	24" x 10'	Vertical	250-500	2	6,187	7,447
F.	24" x 10'	Vertical	1000	3	9,286	10,581
G.	30" x 10'	Vertical	125	2	4,063	5,417
H.	30" x 10'	Vertical	250-500	2	6,187	7,736
I.	30" x 10'	Vertical	1000	3	10,251	11,876
J.	36" x 10'	Vertical	125	2	4,643	6,382
K.	36" x 10'	Vertical	250-500	2-3	7,251	8,932
L.	13" x 5'	Horizontal	1000	2	3,673	3,969
M.	16" x 7.5'	Horizontal	1000	2-3	6,578	7,215
N.	16" x 10'	Horizontal	1000	2-3	6,767	7,600
O.	20" x 10'	Horizontal	1000	2-3	8,801	9,866
P.	24" x 5'	Horizontal	250-500	2	6,093	6,748
Q.	24" x 10'	Horizontal	500	3	7,931	9,227
R.	24" x 10'	Horizontal	1000	3	9,381	10,676
S.	30" x 10'	Horizontal	500	2	7,931	9,552
T.	36" x 10'	Horizontal	125	2	10,829	12,763

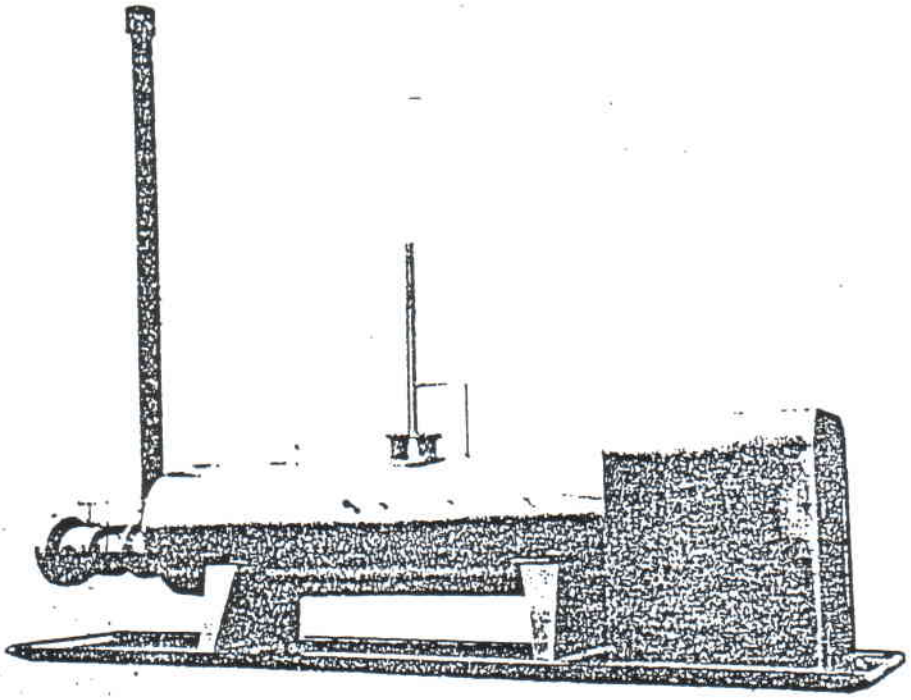
8. SCRUBBERS

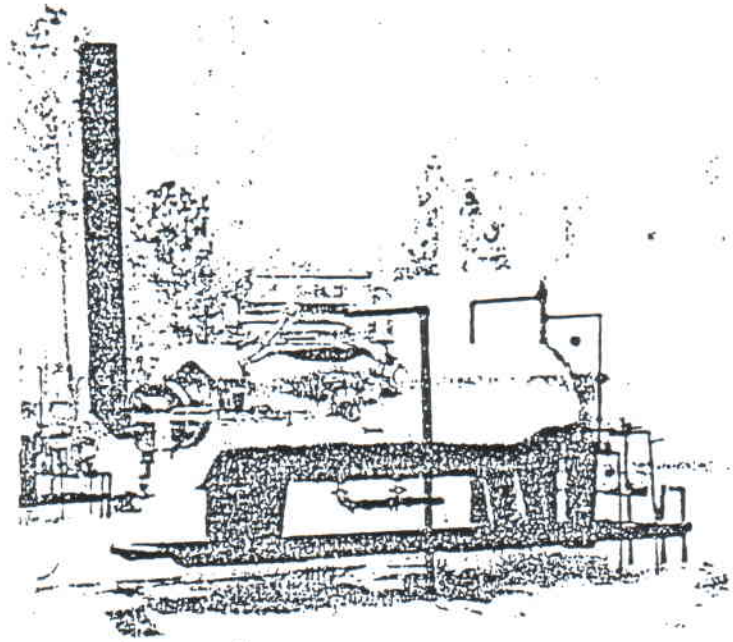
A scrubber separates water from natural gas. It is a cylindrical high pressure vessel, usually horizontal, that is installed at some point in the flow lines. Installed costs include necessary controls, gauges, valves, etc.

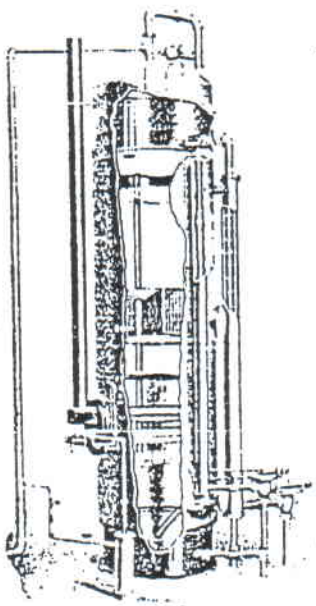
	Size	Type	PSI	Scrubber Only	R.C.N. Installed Cost
A.	8" x 8'	Horizontal	1000	$ 2,129	$ 2,418
B.	10" x 10"	Horizontal	1000	2,898	3,288
C.	12" x 8'	Horizontal	1000	3,288	3,673

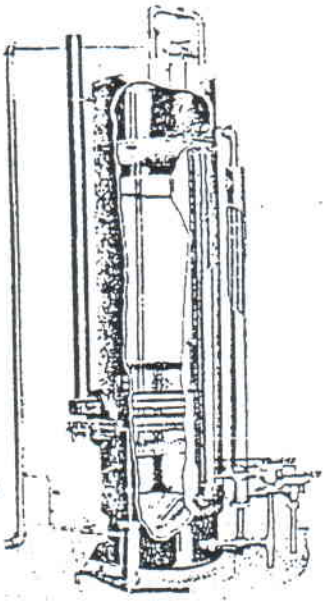
TREATERS











IN-PLACE UNIT COSTS

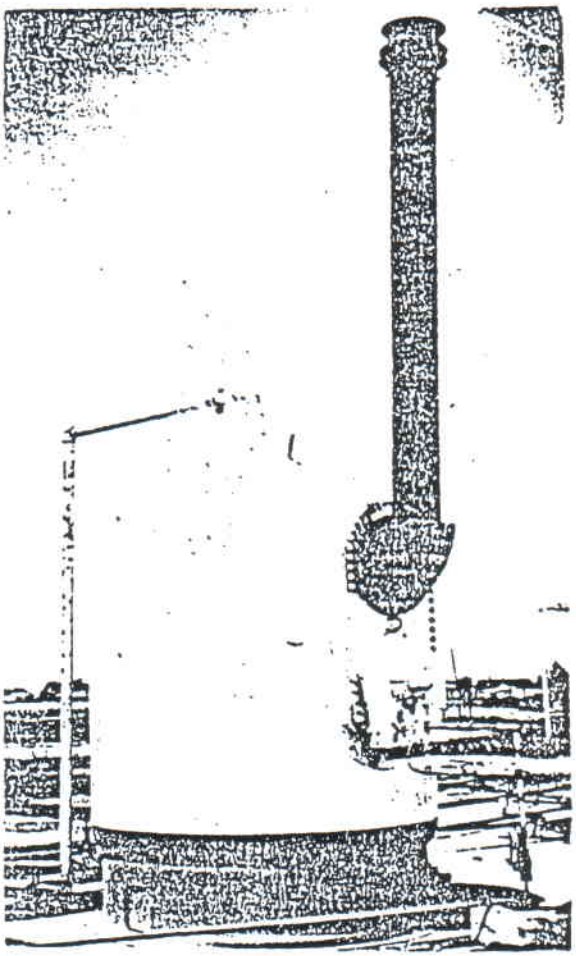
9. TREATERS AND HEATER-TREATERS

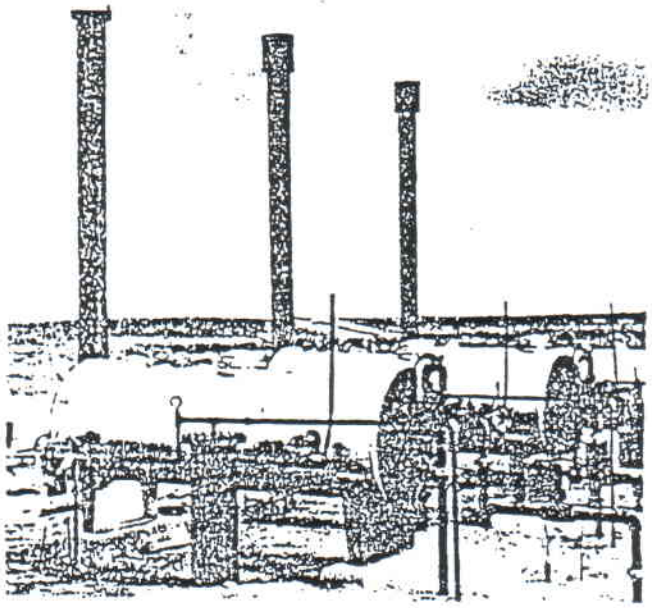
The function of a treater is to separate oil, water, and gas emulsions. Generally, vertical units treat light and medium density emulsions, while horizontal units treat heavy emulsions. Treaters utilize burners (usually natural gas) and their B.T.U. rating may range from 200,000 to 3,000,000 B.T.U. per hour.

Costs include all necessary controls, gauges, valves, and piping.

	Size	Type	PSI	R.C.N. Treater Cost Only	R.C.N. Installed Cost
A.	36" x 15'	Vertical	25-60	$ 15,473	$ 16,443
B.	48" x 20'	Vertical	25-100	16,053	17,211
C.	72" x 20'	Vertical	25-100	20,305	22,050
D.	72" x 24'	Vertical	100	28,041	30,171
E.	72" x 27.5'	Vertical	25-60	21,275	23,694
F.	72" x 26'	Vertical	100	34,813	37,328
G.	96" x 20'	Vertical	40	28,041	30,538
H.	120" x 10'	Vertical	25-60	26,498	27,947
I.	120" x 20'	Vertical	100	32,879	35,777
J.	120" x 28'	Vertical	100	48,352	52,221
K.	48" x 10'	Horizontal	50	10,634	11,605
L.	48" x 12.5'	Horizontal	50	19,341	20,109
M.	48" x 15'	Horizontal	50	12,569	13,343
N.	72" x 15'	Horizontal	50	21,293	23,558
O.	72" x 20'	Horizontal	50-60	26,107	27,852
P.	96" x 20'	Horizontal	40	30,946	33,264
Q.	96" x 30'	Horizontal	40	34,813	38,297
*R.	96" x 30'	Horizontal	50	73,495	76,980
S.	120" x 12'	Horizontal	40	30,561	32,879
*T.	120" x 30'	Horizontal	40	85,100	90,323
U.	120" x 35'	Horizontal	40	50,286	56,473
*V.	120" x 37.5'	Horizontal	40	106,375	112,952

* These are electric units.





IN-PLACE UNIT COSTS

10. HEATERS

Heater units are sometimes required to facilitate crude oil flow where very cold temperatures prevail, or when the crude oil is very heavy and viscous.

Heaters may be either direct in line or indirect. Direct in line heaters are those in which the tubes carrying the product are directly heated by flame from the burner. Indirect heaters are those in which a water solution is heated which in turn heats the tubes carrying the product.

Costs include all necessary controls, gauges, valves and piping.

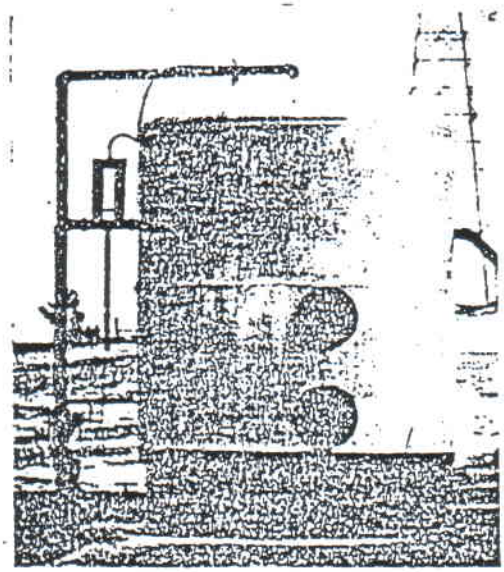
A. DIRECT IN LINE HEATERS

	Size	Type	B.T.U.H.	Heater Cost Only	Installed Cost
1.	18" x 5'	Horizontal	90,000	$ 2,129	$ 2,514
2.	24" x 6'	Horizontal	250,000	3,673	4,158
3.	24" x 10'	Horizontal	250,000	3,869	4,520
4.	24" x 10'	Horizontal	500,000	5,607	6,287
5.	30" x 7.5'	Horizontal	450,000	5,494	6,170
6.	36" x 10'	Horizontal	750,000	6,962	7,736
7.	48" x 10'	Horizontal	1,000,000	8,085	8,861
8.	60" x 12'	Horizontal	1,500,000	11,547	12,515

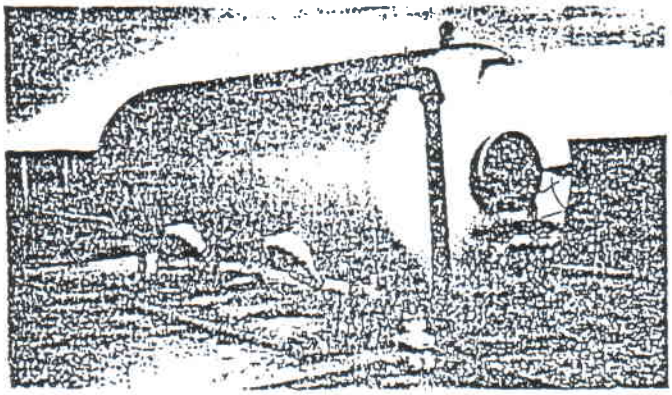
B. INDIRECT HEATERS

1.	18" x 5'	Horizontal	90,000	2,709	3,094
2.	24" x 6'	Horizontal	250,000	3,673	4,158
3.	24" x 10'	Horizontal	250,000	4,063	4,737
4.	24" x 10'	Horizontal	500,000	4,447	5,128
5.	30" x 7.5'	Horizontal	450,000	4,754	5,417
6.	36" x 10'	Horizontal	750,000	5,223	5,997
7.	48" x 10'	Horizontal	1,000,000	9,286	10,055
8.	60" x 12'	Horizontal	1,500,000	12,279	13,249

FREE WATER KNOCKOUTS



VERTICAL



HORIZONTAL

IN-PLACE UNIT COSTS

11. FREE WATER KNOCKOUTS

Many oil wells produce, in addition to crude oil, large volumes of free water. The volume of free water may exceed the capacity of the treating system, necessitating the installation of a free water knockout. The function of a free water knockout is to automatically remove the free water ahead of the treating system, and sends only the emulsion on to be heated and treated.

	Size	Bbls. Per Day Capacity	R.C.N. Knockout Cost Only	R.C.N. Installed Cost
A.	3' x 6'	1,500	$ 3,579	$ 3,869
B.	4' x 6'	2,500	4,892	5,282
C.	4' x 10'	6,000	6,228	6,849
D.	4' x 20'	9,000	7,483	8,453
E.	6' x 10'	10,000	8,257	8,837
F.	6' x 20'	12,000	9,552	10,521
G.	8' x 10'	14,000	11,664	12,628
H.	8' x 15'	9,000	8,707	9,670
I.	8' x 20'	16,000	14,160	15,124
J.	10' x 15'	18,000	15,166	16,324
K.	10' x 20'	20,000	16,887	18,046

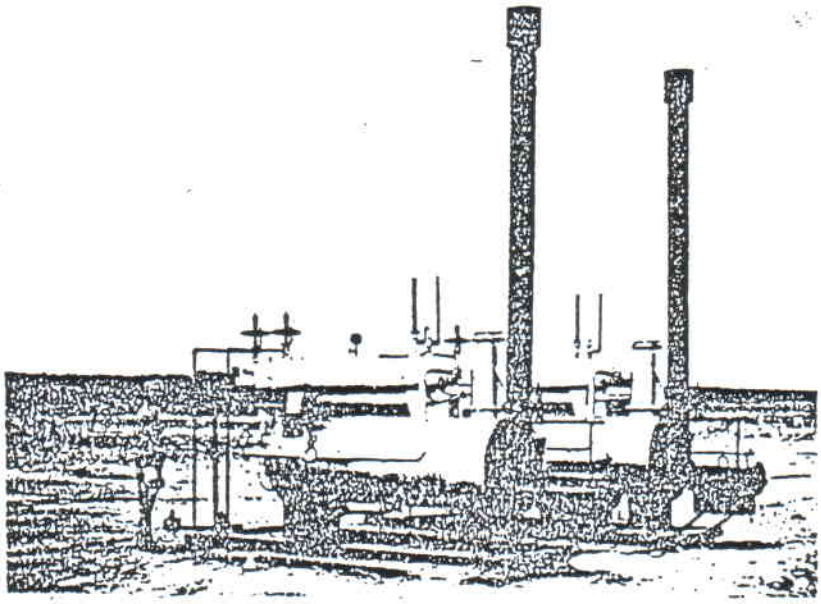
Note: A free water knockout serving more than one well will have a flow splitter consisting of oil outlets for each well. In such cases, add per oil outlet: $536

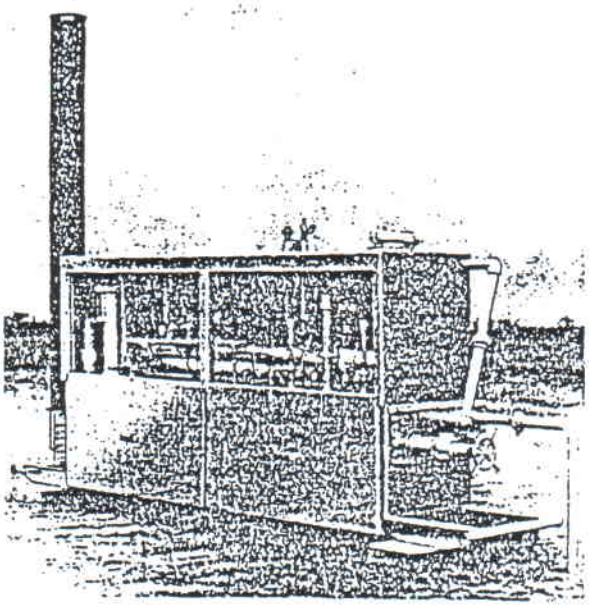
12. GUN BARRELS AND FLOW TANKS

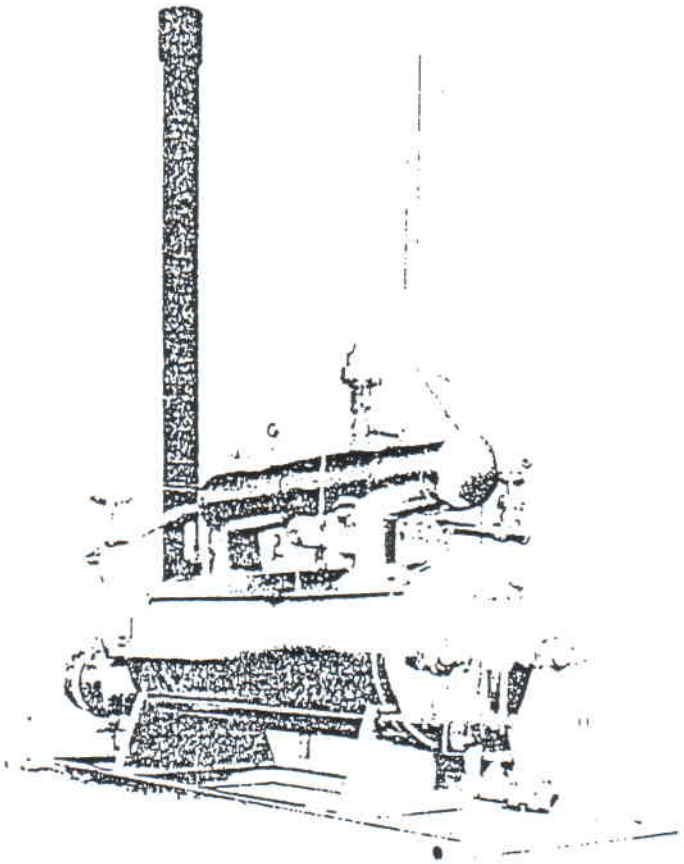
Gun barrels, sometimes called flow tanks or settling tanks, are used for setting water out of oil. They are usually vertical flat roofed tanks resembling tall storage tanks.

	Capacity Bbls.	Diam.	Ht.	Type	R.C.N. Gun Barrel Cost Only	R.C.N. Installed Cost
A.	250	10' x	15'	Welded	$ 7,157	$ 7,695
B.	300	12' x	15'	Welded	7,991	8,760
C.	400	12' x	20'	Welded	9,670	10,693
D.	750	15.5 x	24.2'	Bolted	12,380	13,633

GAS PRODUCTION UNITS







IN-PLACE UNIT COSTS

13. GAS PRODUCTION UNITS

Gas production units combine all the functions of a heater-treater and a high and low pressure separator. They are used on wells where the production is primarily natural gas. The unit may be either enclosed open.

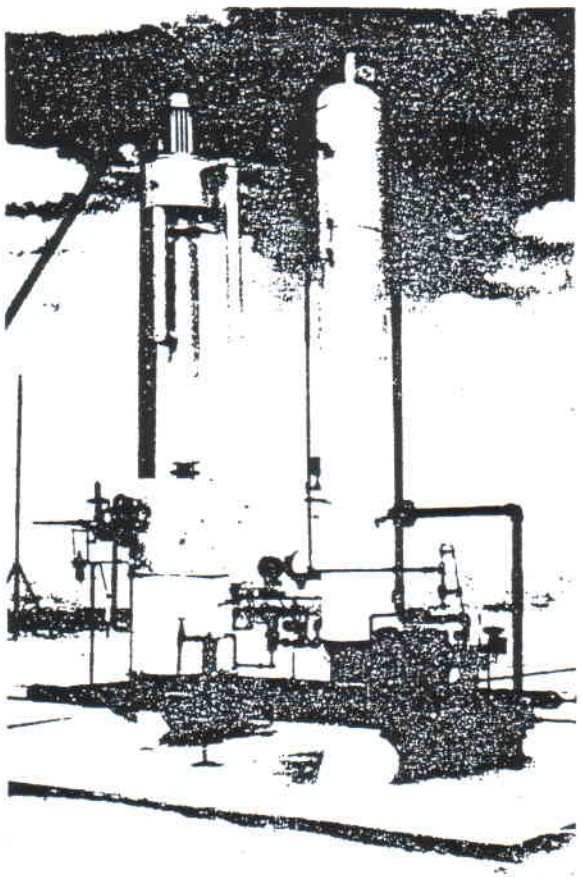
Costs listed here are based on the size of the upper cylinder or vessel, which is a high pressure separator. The lower vessel is a heater, and its size is not a factor in determining the proper R.C.N. If a size is encountered which is not listed here, use the R.C.N. for the nearest listed size and B.T.U.H. rating.

	Size	B.T.U.H.	R.C.N. Unit Cost Only	R.C.N. Installed Cost
A.	12" x 7.5'	250,000	$12,764	$13,735
B.	13" x 10'	750,000	18,372	19,341
C.	16" x 5'	100,000	8,127	9,090
D.	16" x 6'	250,000	9,286	10,251
E.	16" x 7.5'	300,000	12,475	13,538
F.	16" x 7.5'	500,000	13,888	14,952
G.	16" x 10'	150,000	8,801	10,055
H.	16" x 10'	250,000	15,010	16,248
I.	16" x 10'	500,000	17,987	19,247
J.	16" x 10'	750,000-1,000,000	23,712	24,948
K.	20" x 7.5'	750,000	28,721	29,011
L.	20" x 10'	500,000	16,869	18,122
M.	20" x 10'	750,000	19,477	20,731
N.	20" x 10'	1,000,000	23,286	24,564

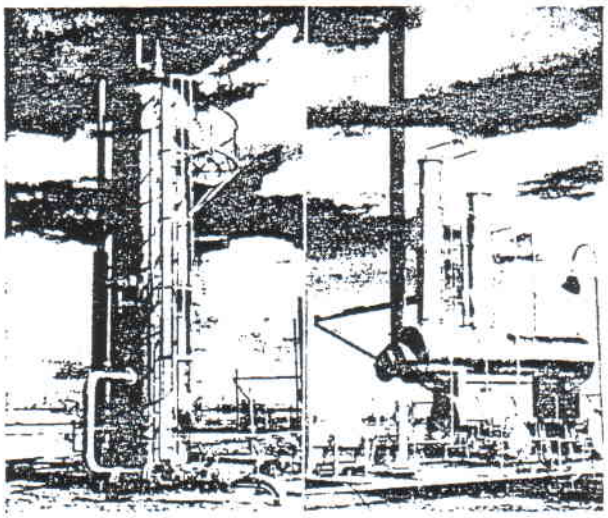
Note: Some gas production units will have a time cycle controller (intermitter) with motor valve attached. See picture in Section IV, Page 38. When this equipment is encountered, use cost below.

		R.C.N.
O.	Time cycle controller (intermitter) with motor valve	$1,933

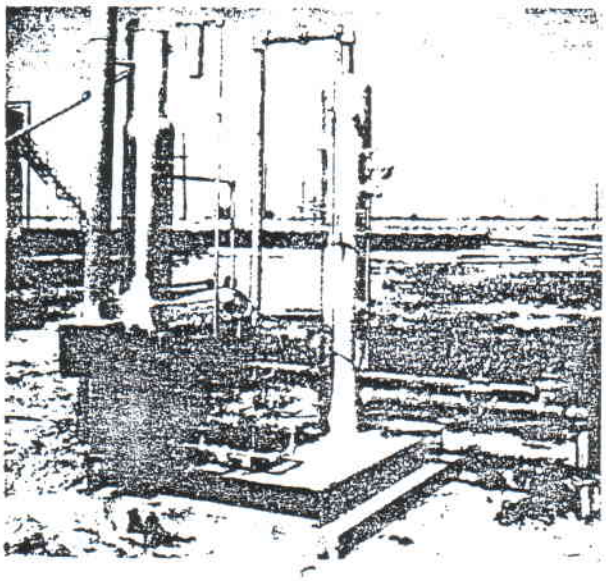
GAS DEHYDRATORS
COMBINATION SEPARATOR-DEHYDRATORS



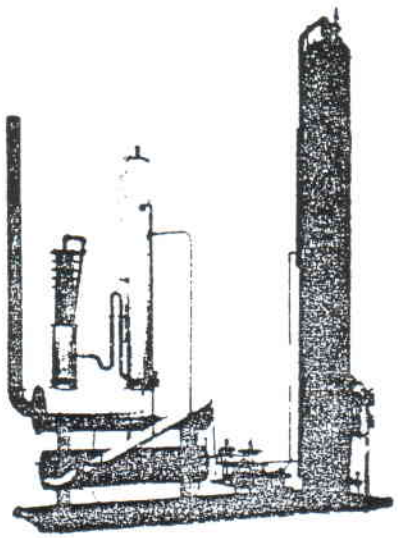
DEHYDRATOR



DEHYDRATORS



COMBINATION SEPARATOR-DEHYDRATOR



DEHYDRATOR

IN-PLACE UNIT COSTS

14. DEHYDRATORS

Dehydration units, also known as dryers, remove water vapor from raw natural gas. There are two types, one which uses glycol, and the other which uses calcium chloride, as a drying agent. Dehydrators will vary in cost according to the volume of gas handled per day. If the volume per day can be determined from the identification or specification plate, or from the owner, the R.C.N. of a dehydrator can be computed by its daily capacity according to the following schedule.

	Capacity Per Day	R.C.N. Per MMCF
A.	Up to 10,000,000 cu. ft. day	$4,832
B.	Over 10,000,000 cu. ft. day	4,252
C.	Installation cost each dehydrator - $1,160	

EXAMPLE

The R.C.N. of a dehydrator having a capacity of 7,000,000 cubic feet per day is computed as follows:

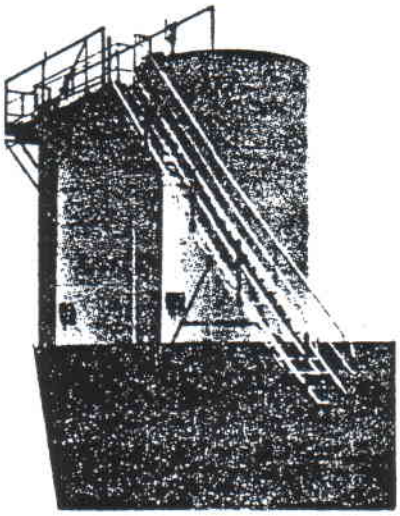
Item	Description	
14A	7 MMCF/day dehydrator @ $4,832	$33,824
14C	Installation cost	1,160
	Total installed R.C.N.	$34,984

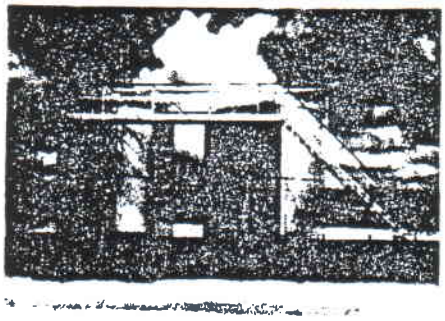
COMBINATION SEPARATOR - DEHYDRATORS

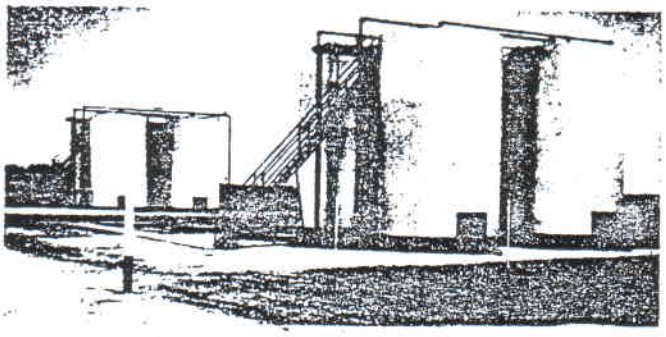
Combination separator-dehydrator units will be found in certain gas fields. The function of the separator portion is to remove water droplets from the gas, which then flows into the dehydrator portion for removal of water vapor. The following costs apply to these units.

	Size	R.C.N. Unit Cost Only	R.C.N. Installed Cost
D.	2,000,000 cu. ft. day	$17,407	$18,566
E.	4,000,000 cu. ft. day	19,341	20,501
F.	6,000,000 cu. ft. day	21,275	22,434

WELDED STEEL TANKS







15. WELDED TANKS

	Capacity Bbls.	Diam.		Ht.	R.C.N. Tank Cost Only	R.C.N. Installed Cost	Stairway Add
A.	90	8'	x	10'	$ 3,365	$ 3,944	$ 385
B.	100	8'	x	12'	3,637	4,234	520
C.	150	9.5'	x	12'	4,199	4,874	520
D.	200	12'	x	10'	5,027	5,802	385
E.	210	10'	x	15'	5,027	5,708	620
F.	250	11'	x	15'	5,027	5,802	620
G.	250	12'	x	12.5'	6,187	6,962	520
H.	300	12'	x	15'	5,802	6,578	620
I.	400	12'	x	20'	6,690	7,465	834
J.	500 Lo	21.5'	x	8'	9,670	11,220	367
K.	500 Hi	15.5'	x	16'	8,741	9,901	674
L.	750	15.5'	x	24'	12,764	13,923	1,023
M.	1000	21.5'	x	16'	16,341	17,892	674
N.	1340	20'	x	24'	18,956	17,193	1,023
O.	3000	30'	x	24'	30,946	34,813	1,023

P. Steel catwalk per lin. ft. Add 42
Q. Welded steel ladder - add one-third (1/3) of stairway cost.
R. Formula for converting circumference to diam. = $\frac{\text{circ}}{3.14}$

Generally, each tank or group of tanks will have a stairway. If two or more tanks are clustered together, there will also be a catwalk but only one stairway.

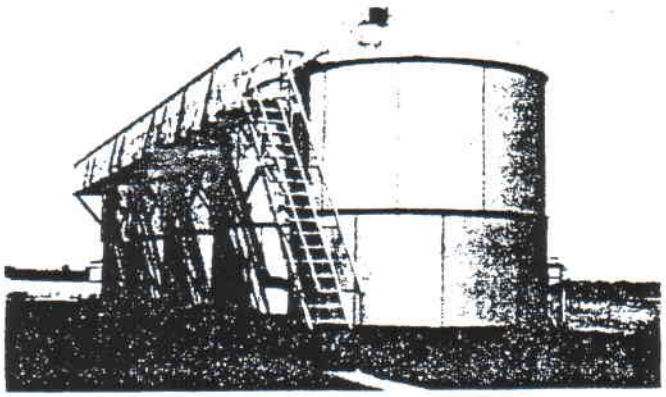
EXAMPLE

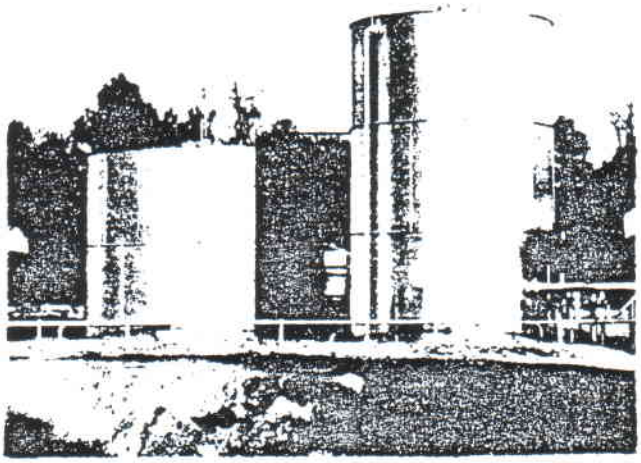
The R.C.N. of two 300 barrel welded tanks, one stairway, and 30 lin. ft. of catwalk be computed as follows:

Item	Description	R.C.N.
15H.	2-300 bbl. welded tanks @ $6,578	$13,156
15H.	1 stairway for 15' ht. tank	620
15P	30 lin. ft. steel catwalk @ $42	1,260
	Total Installed R.C.N.	$15,036

Note: For tanks larger than those listed above, refer to Section VI.

BOLTED METAL TANKS





IN-PLACE UNIT COSTS

16. BOLTED TANKS

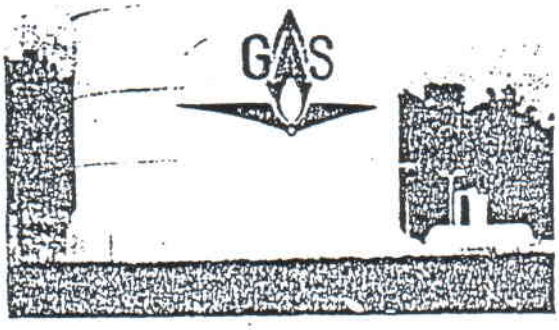
	Capacity Bbls.	Diam.		Ht.	R.C.N. Tank Cost Only	R.C.N. Installed Cost	Stairway Add
A.	65	7'8"	x	8'1"	$ 5,069	$ 5,802	$ 367
B.	100	9'3"	x	8'1"	5,785	6,767	367
C.	130	7'8"	x	16'1"	7,387	8,546	674
D.	200	9'3"	x	16'1"	7,754	9,090	674
E.	250	15'5"	x	8'1"	9,286	10,829	367
F.	300	9'3"	x	24'2"	10,113	11,860	1,023
G.	500 Lo	21'7"	x	8'1"	14,118	16,053	367
H.	500 Lo	15'5"	x	16'1"	12,650	14,586	674
I.	750	15'5"	x	24'2"	17,602	19,920	1,023
J.	1000 Lo	29'9"	x	8'1"	21,275	25,144	367
K.	1000 Hi	21'7"	x	16'1"	19,069	21,777	674
L.	1500	21'7"	x	24'2"	24,256	27,733	1,023
M.	2000	29'9"	x	16'1"	32,259	37,481	674
N.	3000	29'9"	x	24'2"	42,976	49,742	1,023
O.	3500	29'9"	x	28'5"	45,123	53,823	1,336
P.	5000	38'9"	x	24'11"	50,593	62,198	1,023
Q.	10000	55'2"	x	24'2"	64,499	83,840	1,023
R.	Steel catwalk per lin. ft.				Add		42
S.	Welded steel ladder - add one third (1/3) of stairway cost.						

Compute R.C.N. for bolted tanks in same manner as in the example. Section IV, Page 28.

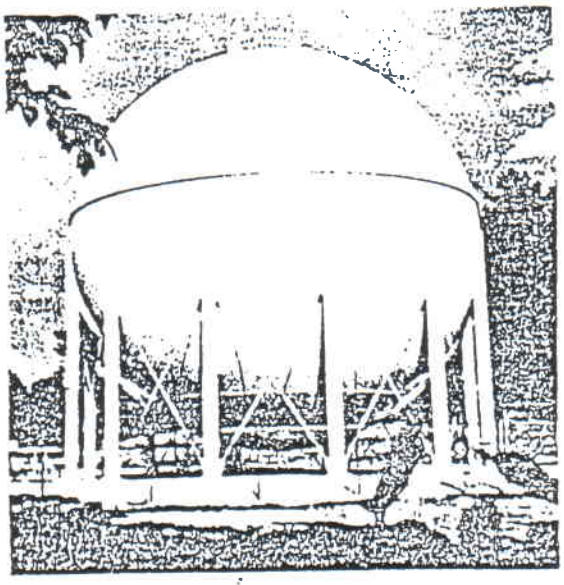
17. FIBERGLASS TANKS

	Capacity Bbls.	Diam.		Ht.	Type	R.C.N. Tank Cost Only	R.C.N. Installed Cost
A.	50	6.5'	x	7'	Open Top	$1,260	$ 1,449
B.	50	6.5'	x	7'	Closed Top	1,550	1,857
C.	110	11.5'	x	6'	Closed Top	2,378	2,803
D.	210	16'	x	6'	Closed Top	4,158	5,027
E.	300	12'	x	15'	Closed Top	7,387	8,861
F.	400	12'	x	20'	Closed Top	8,937	10,829
G.	525	16'	x	16'	Closed Top	11,025	13,538

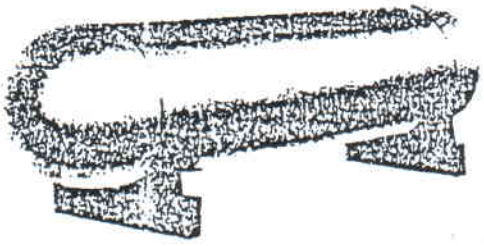
PETROLEUM STORAGE TANKS



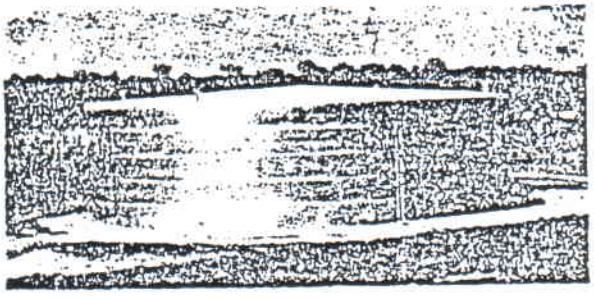
HEMISPHEROID PRESSURE TANK



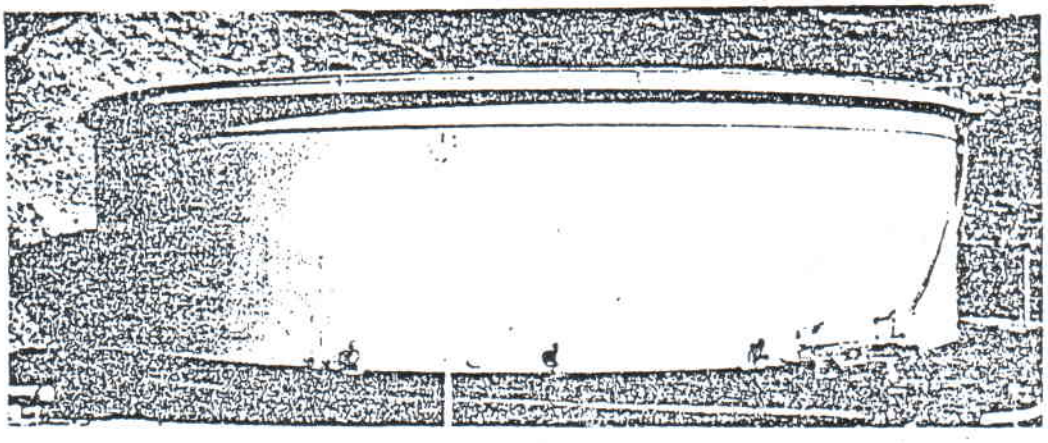
SPHERE PRESSURE TANK



HORIZONTAL PRESSURE TANK



FIXED ROOF OIL STORAGE TANK



FLOATING ROOF OIL STORAGE TANK

4. Petroleum Storage Tanks

The tanks listed here are often related to pipelines. The welded steel oil storage tanks may be found at collection points along a pipeline, while some pressure tanks are usually located at gas processing plants served by gas pipelines.

The larger tanks are usually custom engineered, which results in cost variances. The installed costs listed below represent only average or typical installations.

A. Welded steel oil storage tanks

Costs include dike, foundation, gravel base, roof and shell manholes, vents, paints, and necessary fittings. When a tank is encountered, the exact size of which is not listed here, use the R.C.N. per bbl for the nearest capacity listed.

Capacity Bbls.	Diam.	Ht.	R.C.N. Per Bbl. Fixed Roof	R.C.N. Per Bbl. Floating Roof
2,000	25'	x 24'	$17.21	$22.18
2,000	30'	x 16'	15.14	21.06
3,000	30'	x 24'	12.78	16.73
4,000	30'	x 32'	11.65	14.55
5,000	38'	x 24'	10.23	13.25
7,500	38'	x 36'	8.75	10.71
10,000	55'	x 24'	7.68	9.88
15,000	55'	x 36'	6.68	8.16
20,000	60'	x 40'	5.92	7.16
30,000	80'	x 34'	5.08	6.20
50,000	90'	x 44'	4.97	5.73
75,000	120'	x 36'	4.80	5.44
100,000	140'	x 37'	4.61	5.26
125,000	160'	x 35'	4.32	4.80
150,000	180'	x 33'	3.95	4.50
200,000	200'	x 36'	3.50	3.95
250,000	220'	x 36'	3.37	3.67
300,000	240'	x 37'	3.19	3.50

B. Welded horizontal pressure tanks

Costs include saddles or legs and fittings, but not valves.

Capacity Gallons	Diam.		Length	R.C.N.
500	3.5'	x	8'	$ 2,176
1,000	3.5	x	16'	2,792
1,500	5'	x	11'	3,879
2,000	5'	x	15'	4,885
2,500	5'	x	19'	5,866
3,000	5'	x	22'	6,785
4,000	5'	x	29'	8,570
5,000	5'	x	36'	10,309
7,500	6'	x	37'	14,248
10,000	6'	x	50'	18,033
12,500	6'	x	61'	21,541
15,000	7.5'	x	50'	25,007
20,000	7.5'	x	65'	31,531

C. Sphere pressure tanks

Costs include erection, structural supports, foundation and appurtenant equipment.

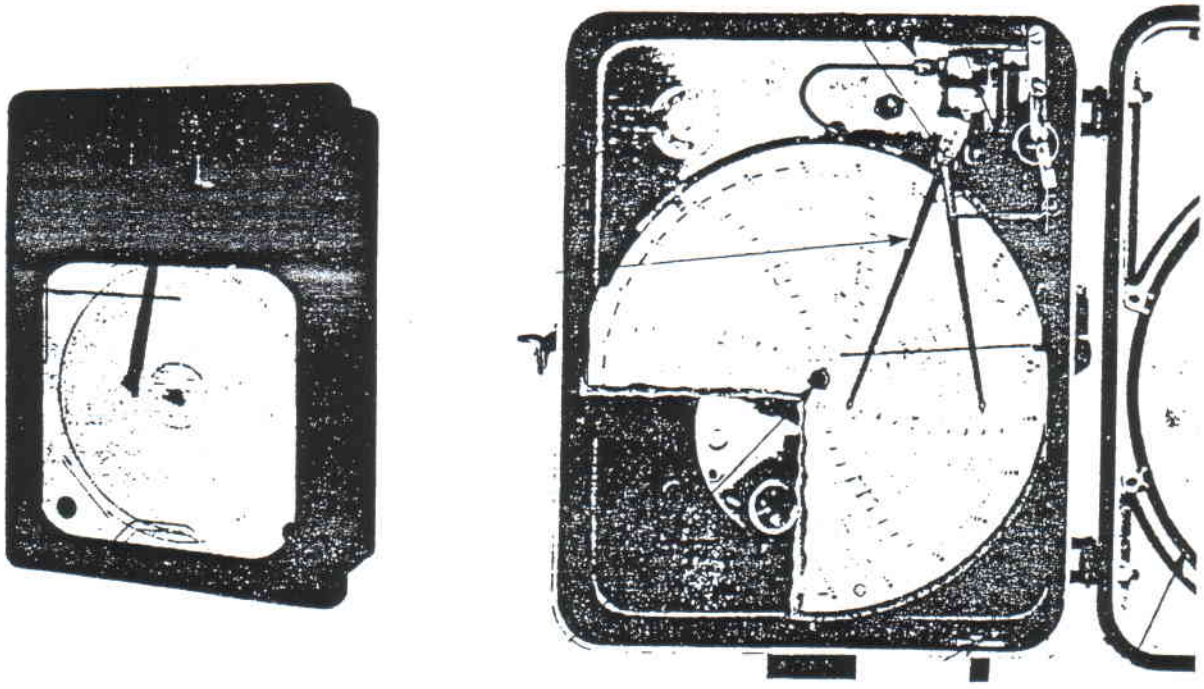
	R.C.N. Each By Pressure Rating		
Capacity Gallons	30 lb. W.P.	50 lb. W.P.	75 lb. W.P.
210,000 (5000 bbls.)	$171,005	$192,002	$202,506
420,000 (10,000 bbls.)	256,506	291,006	345,008

D. Hemispheroid pressure tanks

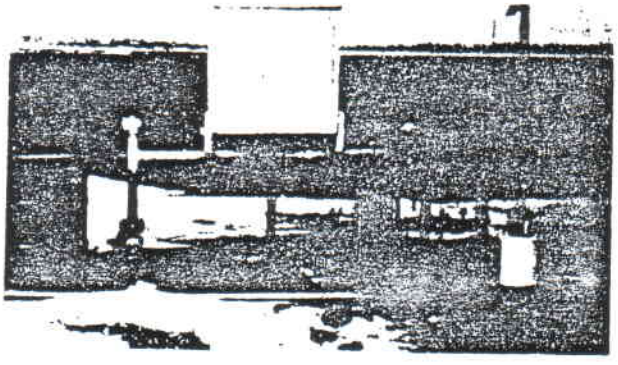
Costs include erection, structural supports, foundation, and appurtenant equipment.

	R.C.N. Each By Pressure Rating		
Capacity Gallons	5 lb. W.P.	10 lb. W.P.	25 lb. W.P.
105,000 (2500 bbls.)	$ 57,000	$ 70,502	$ 93,001
210,000 (5000 bbls.)	88,500	106,499	135,002
420,000 (10,000 bbls.)	138,001	160,500	195,006
840,000 (20,000 bbls.)	216,003	244,506	288,007

METERING DEVICES

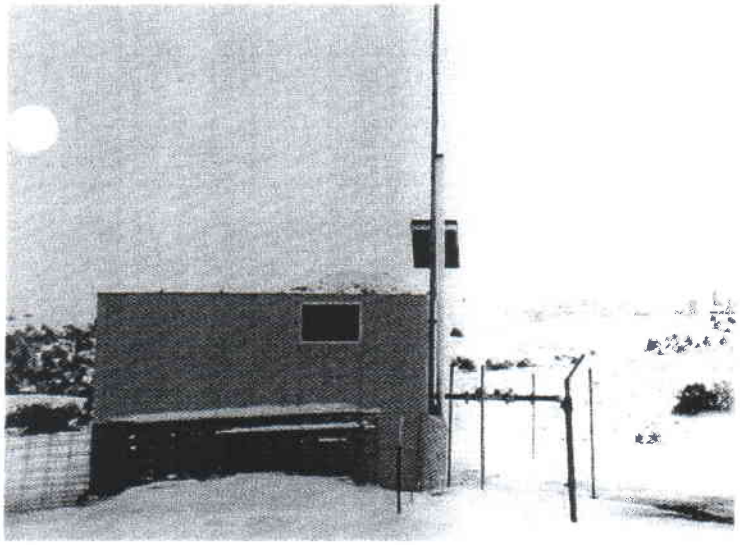


RECORDING METERS

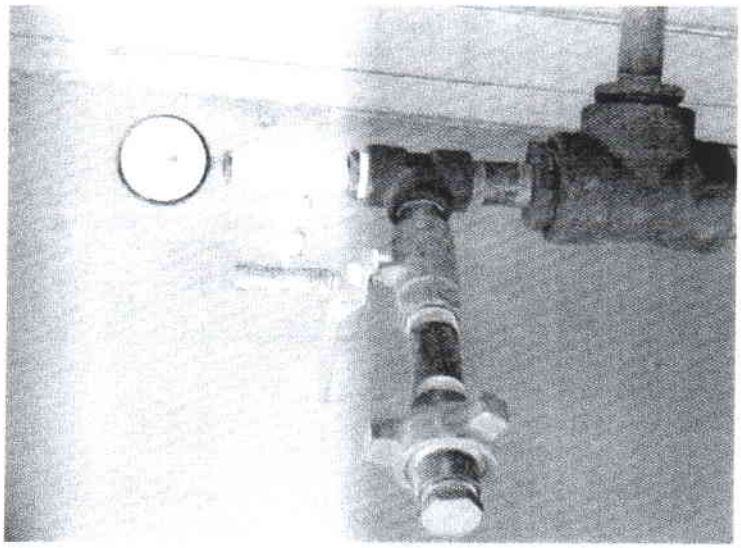


METER RUN WITH RECORDER METER

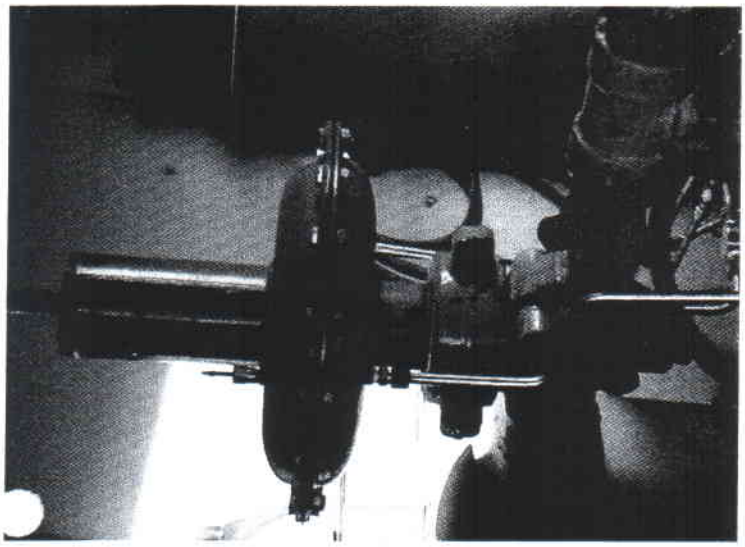
Gas Wells



Meter Shed



Metering Equipment



IN-PLACE UNIT COSTS

18. METERING EQUIPMENT

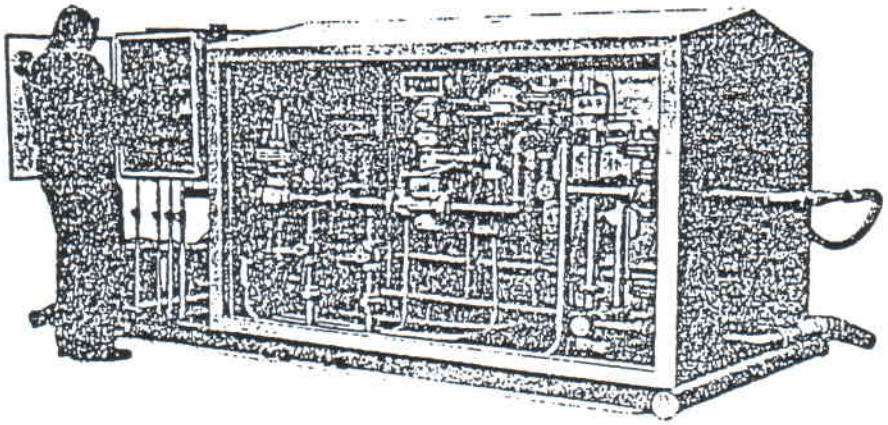
LACT ("Lease Automatic Custody Transfer") meters automatically measure, sample and transfer oil from a lease gathering system into a pipeline.

Fluid meters measure the oil, but do not perform all the automatic functions of a LACT meter. Types of LACT and fluid meters are illustrated on page 33.

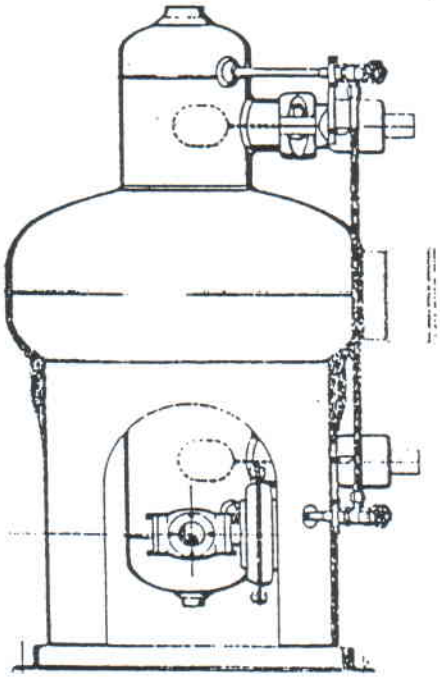
Gas orifice meters measure and record the volume of natural gas sold. A meter run, as listed here, means the necessary piping, valves, and supports required for proper installation of the recording meter. Care must be exercised in determining the ownership of the gas meter, as it is usually owned by the pipeline company or gas company purchasing the gas, but may occasionally be owned by the well operator.

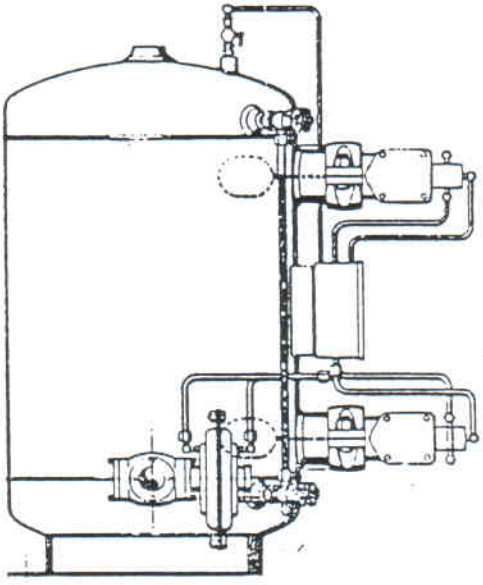
		Diam.	Height	Unit Cost Only	Installed Cost
A.	LACT Meter Unit			$20,890	$22,238
B.	Fluid Meters				
1.	One level control	24"	39"	4,294	4,489
2.	One level control	30"	38"	4,915	5,104
3.	One level control	36"	52"	7,736	7,931
4.	One level control	20"	38"	5,667	5,956
5.	One level control	24"	45"	5,802	6,093
6.	One level control	30"	54"	8,665	8,955
C.	Gas Orifice Meters				
1.	Recording meter only				1,448
2.	2" meter run with recording meter				2,514
3.	2" meter run with recording meter - skid mtd.				5,802
4.	3" meter run with recording meter				3,094
5.	3" meter run with recording meter - skid mtd.				6,767
6.	4" meter run with recording meter				4,447

METERING DEVICES



LEASE AUTOMATIC CUSTODY TRANSFER UNIT





FLUID METERS

IN-PLACE UNIT COSTS

19. FLOW LINES

Flow lines are the small diameter pipes through which crude oil or gas flows from the well head through the treating and processing equipment to the storage tanks or to a gathering line.

Length of flow lines can be determined from the owner or operator's declaration, or may be estimated by stepping off the distance from the well head to the furthest item or equipment, and to the sludge pit.

Cost are for buried and include all necessary pipe, valves and fittings.

	Size	Installed R.C.N. Per Line Ft.	
		Steel	Fiberglass or Plastic
A.	2" I.D.	$3.85	$3.50
B.	3" I.D.	6.27	4.43
C.	4" I.D.	8.70	6.50

20. HEADERS AND MANIFORDS

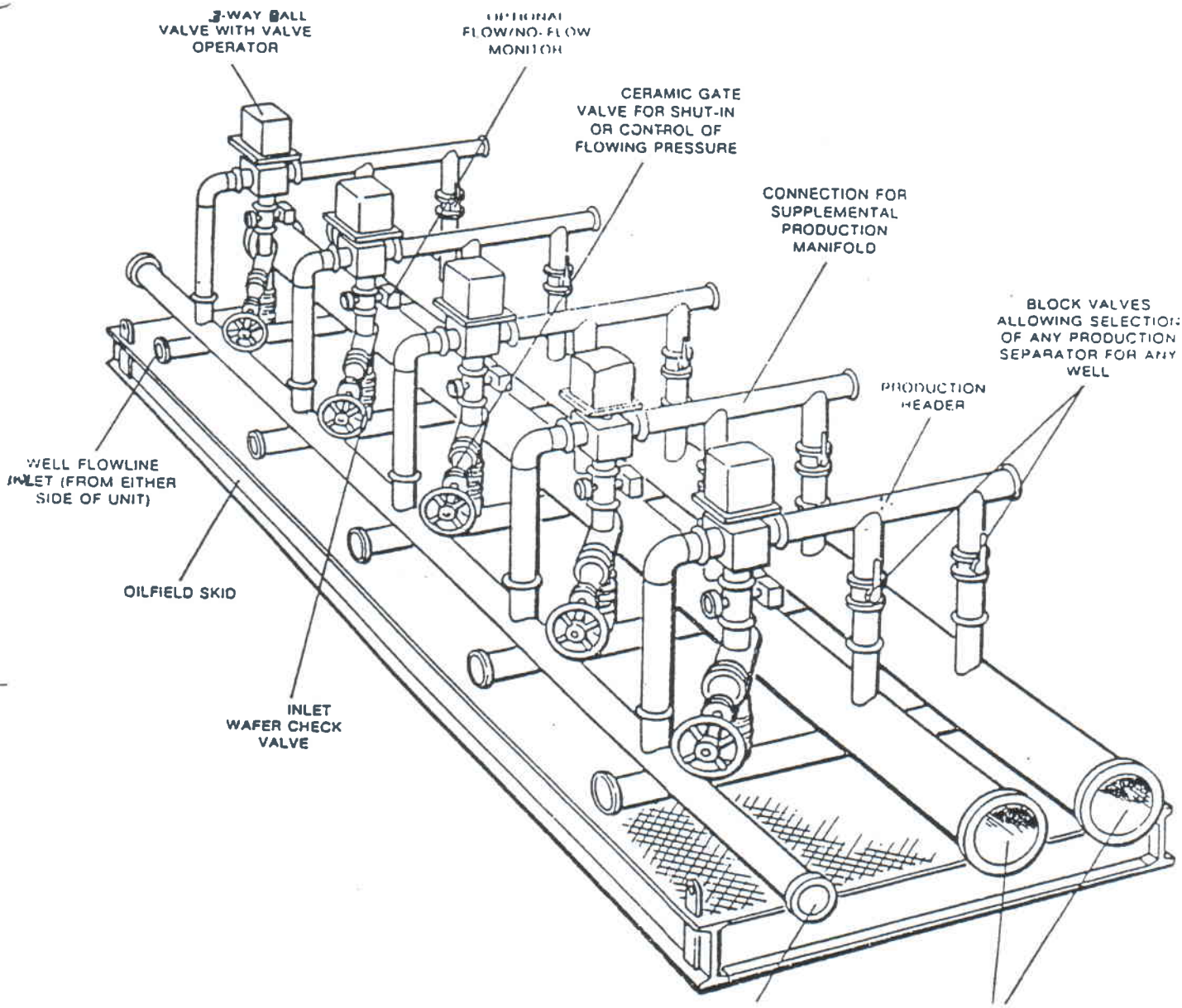
A header sometimes known as a manifold, is an assemblage of valves, pipes, and couplings located within the flow line system. It controls the pressure and directs the flow of the oil to one or more items of treating or storage equipment. Headers will be encountered at central collection stations serving several wells but may also be utilized at individual well installation. They are also used to control pressure and flow of injection water in secondary recovery operations.

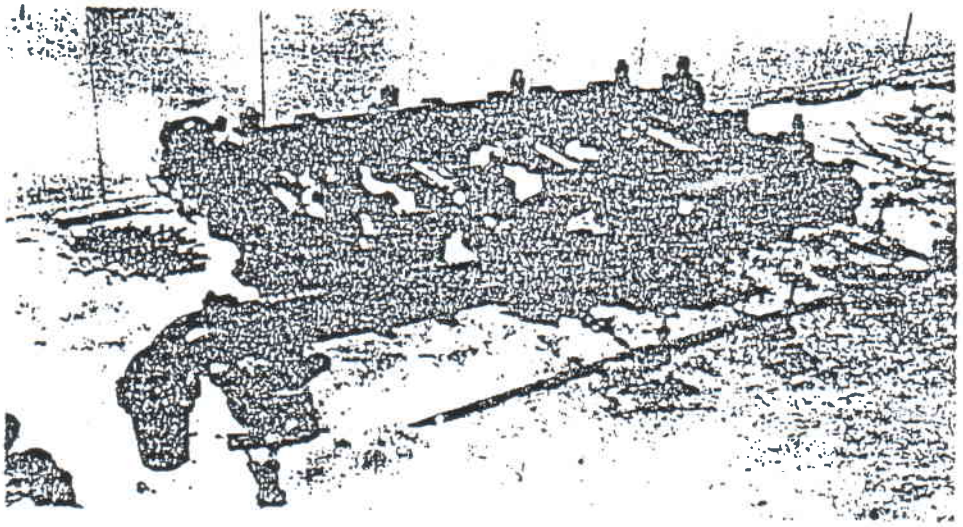
Whenever possible, the original installed cost should be obtained and depreciated according to age and condition. There are great cost variances in headers and manifolds due to differences in pipe size, types of valves, and pressure.

When original costs are not available, the more simple headers and manifolds can be valued by counting the number of wells being served by the header, and using the following schedule.

	Pipe Size	R.C.N. PER WELL	
		Manual Valves	Automatic Valves
A.	2"	$385	$485
B.	3"	485	580
C.	4"	580	674

HEADERS AND MANIFOLDS





IN-PLACE UNIT COSTS

21. RECYCLE AND RECIRCULATING PUMPS

Occasionally, the quality of crude oil in a storage tank does not meet specifications required for its sale. In such a case, the oil is then recirculated through the treater again. This is accomplished by a small recycle or recirculating pump, usually located between the treater and the tanks.

		Unit Cost Only	Installed Cost
A.	Recycle pump with electric motor	$1,260	$1,739
B.	Recycle pump with gas engine	1,840	2,318

IN-PLACE UNIT COSTS

22. INJECTION SYSTEMS

Injection equipment will be found in fields where pressure maintenance techniques and secondary recovery methods are applied. These methods involve the practice of injecting air, gas, or water, or a combination of gas and water into a hydrocarbon reservoir to maintain or replace natural pressure so that more of the oil in place can be produced.

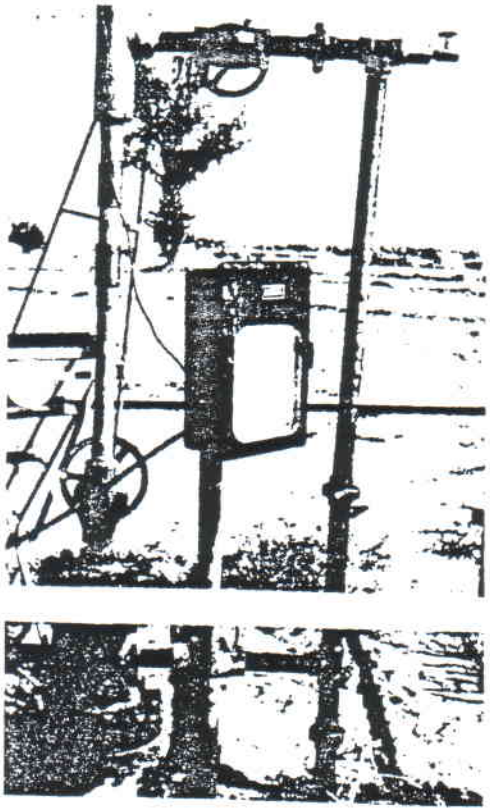
Water flooding is the most common secondary recovery method used in Montana. Water under pressure is pumped down injection wells into the oil reservoir and moves toward the oil wells, driving reservoir oil ahead of it. Equipment usually involved in this method include pumps for producing water, water treatment facilities, and high pressure pumps for injecting the water, in addition to the water pipes and valves. Gas and air injection involves compressor equipment.

All this equipment is taxable and must not be overlooked. Because of the variables of this equipment which is often complex and highly sophisticated, it is recommended that the original installed cost of such equipment be obtained.

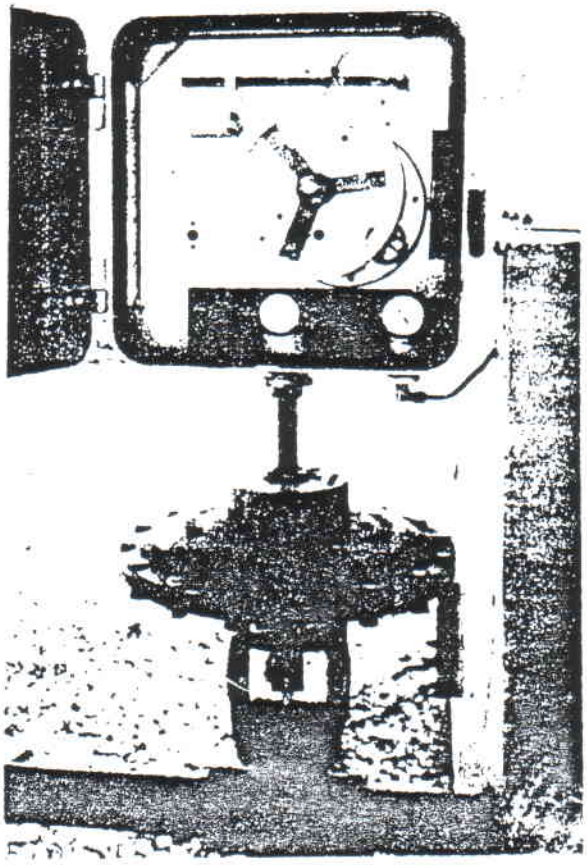
23. ELECTRONIC AND COMPUTERIZED CONTROLS

Electronic and computerized control and information systems are sometimes utilized in oil and gas production. The systems may monitor performance, log data, and produce tape for central accounting on an automatic and continuous basis.

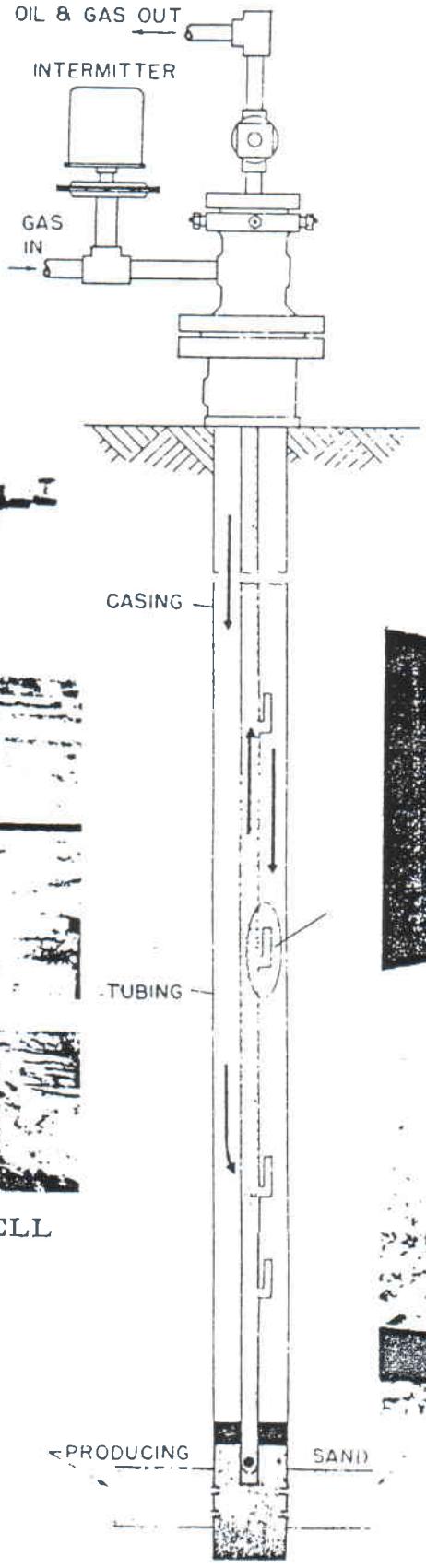
This equipment is often leased. Ownership of the equipment must be ascertained, and the equipment then must be valued the same as all other electronic and data processing equipment in the county.



PLUNGER GAS LIFT WELL



INTERMITTER



GAS LIFT OPERATION

IN-PLACE UNIT COSTS

24. GAS LIFT EQUIPMENT AND INTERMITTER

Gas lift is a method of producing oil, in which gas under pressure is used to lift the well fluids. It is occasionally used to produce low volume wells infields where natural gas is available.

Under this system, gas is intermittently injected into the well. It may enter the tubing through a gas lift valve so that fluid above the gas inlet is raised to the surface by the expanding gas. See diagram on page 38. It may also be injected into the tubing below the bottom of a plunger. The gas under pressure lifts the plunger and the fluid above it to the surface.

A. Gas lift plunger operation equipment:

	R.C.N.
Includes plunger and intermitter	$4,932

B. Intermitter

This is a time cycle controller that operates a motor valve (diaphragm). In addition to being used with gas lift equipment, intermitters may be used with certain other oil and gas equipment. Listed here is the R.C.N. for the intermitter only.

	R.C.N.
Intermitter with motor valve.	$1,933

IN-PLACE UNIT COSTS

25. OIL FIELD ENGINES AND MOTORS

A. Gas Engines - Multi-cylinder

	Brake Horse Power Range	R.C.N. Per Brake H.P.
1.	20 - 300	$196
2.	301 - 500	255
3.	501 - 1500	212

B. Gas Engines - single or twin cylinder

	Brake Horse Power Range	R.C.N. Per Brake H.P.
1.	10 - 20	$657
2.	21 - 30	503
3.	31 - 75	385
4.	76 - 300	319

C. Electric Motors with control panel

	Horse Power Range	R.C.N. Per H.P.
1.	5 - 10	$125
2.	11 - 20	95
3.	21 - 75	77
4.	76 - 100	66

26. WATER FLOOD AND SALT WATER DISPOSAL PUMPS

A. Plunger Pumps (triplex and quintuplet)

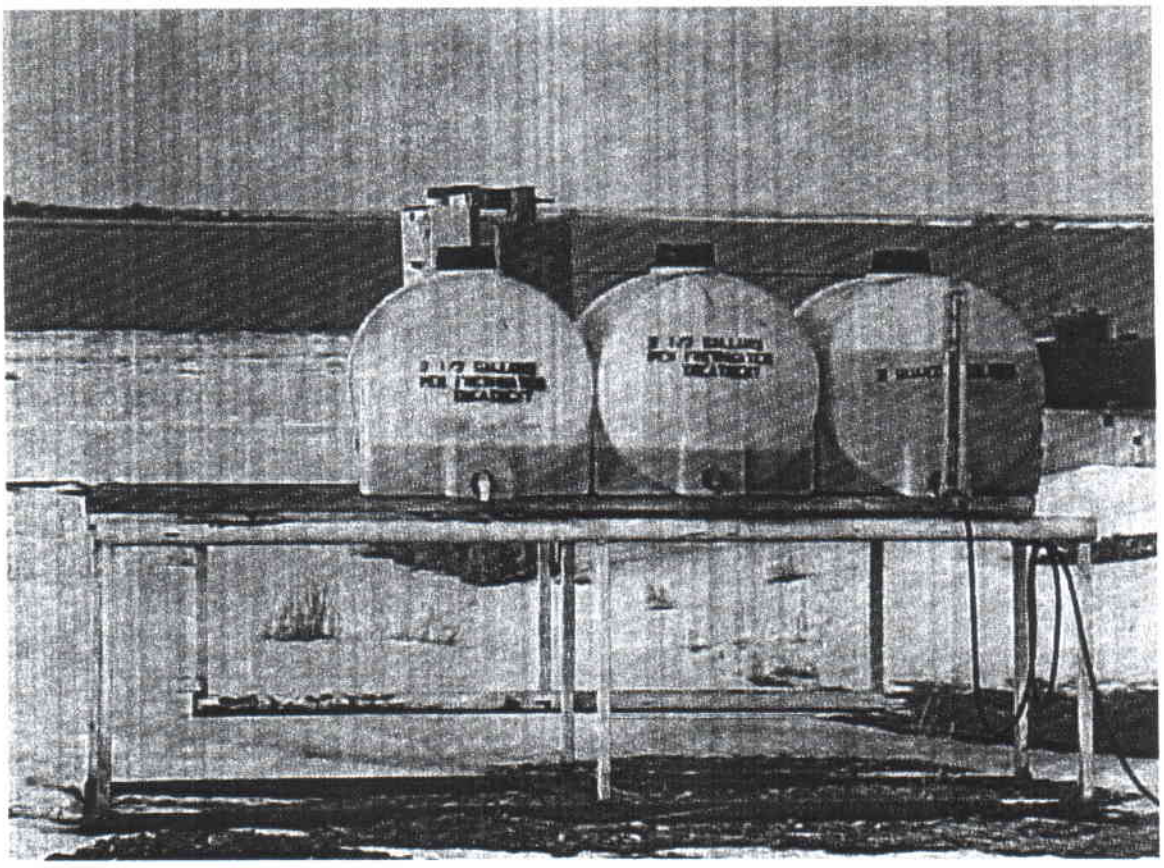
	Input Horse Power Range	R.C.N. Per H.P.
1.	50 - 500	$201
2.	501 - 700	196

PART OF SECTION 4

CHEMICAL TANKS

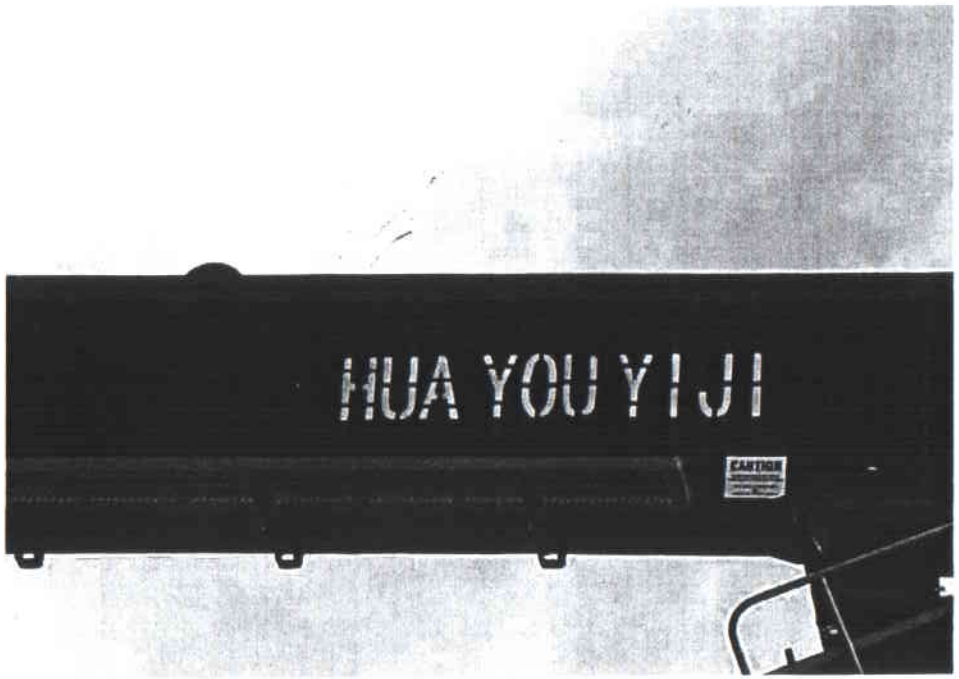
FLARE STACKS

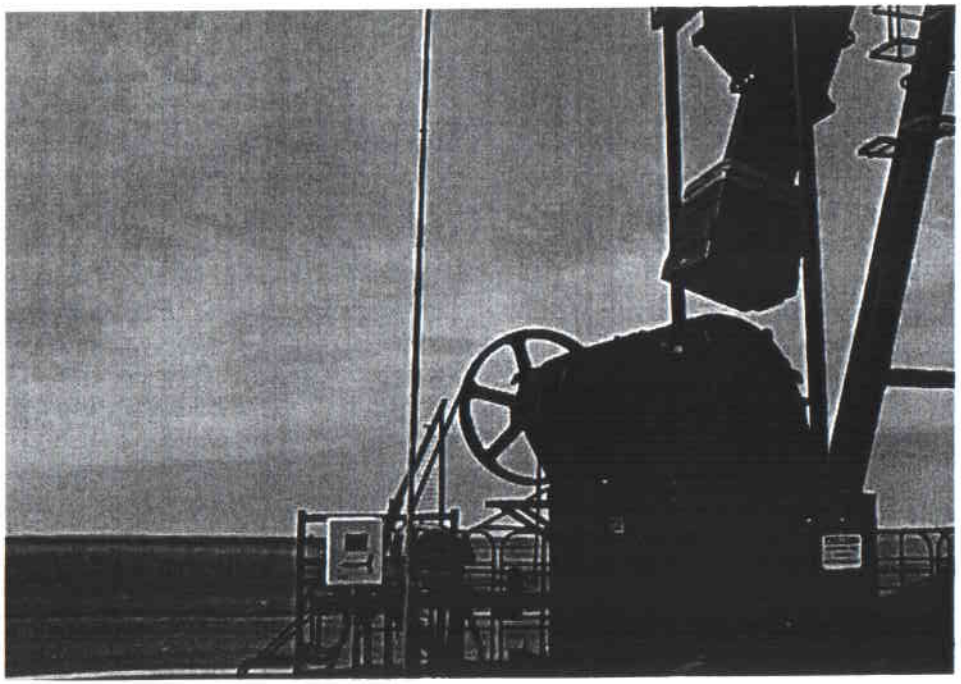
SOLAR IGNITERS



Chemical Tanks

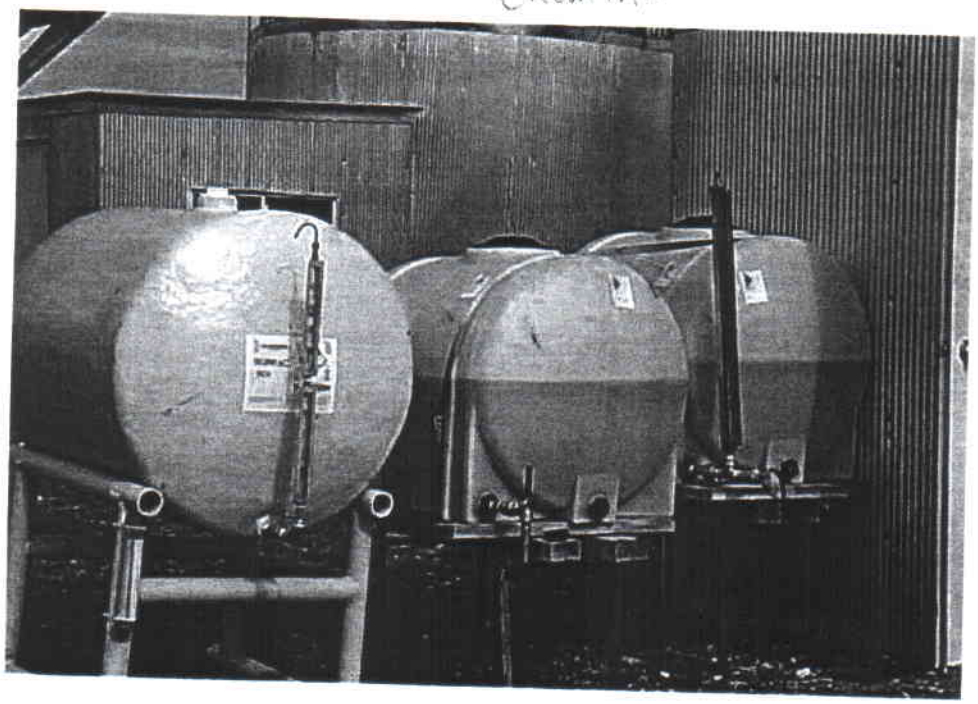
Pneumatic

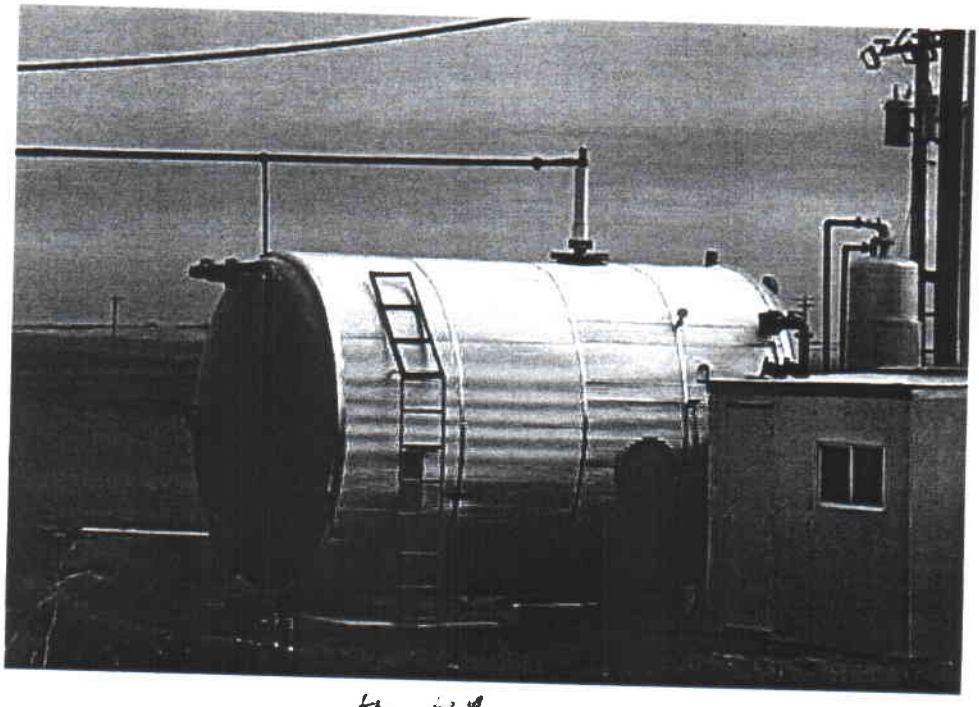




Chinese built
Canadian owned company

CHEMTANKS





TREATER

SECTION V

WELL DRILLING RIGS

WELL DRILLING RIGS

GENERAL

The drilling rig costs listed in this manual apply only to skid mounted rotary rigs, the components of which are transported by truck to a location, and which are then set up to make a complete rig.

The replacement cost new of these rigs is based upon their drilling depth capacities. The replacement cost new of most rigs is very comparable to other rigs of the same depth capacity, regardless of the make of the rig.

DETERMINATION OF DRILLING DEPTH CAPACITY

Many older drilling rigs now have greater depth ranges than when new. This is due to the fact that some of the original rig components have been replaced with components which have greater capacity.

To ensure that a rig is properly rated for valuation purposes, the assessor shall use the drilling contractor's stated depth capacity. The depth capacity can be obtained from the owner.

1. WELL DRILLING RIGS

A. SKID MOUNTED ROTARY RIG

A skid mounted rotary well drilling rig is comprised of components which are transported by truck to the location, and which are then set up to make a complete rig. It consists of the parts normally associated with such rigs and specifically includes: derrick and substructure, crown block, traveling block, drilling lines, sand line, rotary hose and standpipe, hook, tongs and swivel, elevators, kelly, rotary table, draw works, engines, instruments, slush pumps, mud pumps, generators, mud tanks, fuel tanks, boilers and feed pumps, blowout preventers, tools and supplies, drill pipe, tool joints, and water systems.

B. SERVICING RIG

A well servicing rig is a self-propelled unit consisting of a hoist, derrick or mast, and engine, mounted on a specially built chassis or carrier. It is used almost exclusively for hoisting and running rods and tubing in producing wells.

C. WORKOVER RIG

A well workover or well completion rig is a self-propelled or trailer mounted unit similar to a well servicing unit but has additional equipment such as a rotary table or rotating gear which allows it to rotate tubing or small drill pipe and thereby perform the limited amount of drilling required in completion or remedial work. It must also have a circulating pump, usually requiring an individual engine to power it, and steel circulating pits.

DRILL RIG DEPRECIATION SCHEDULE
(BEVS - SCREEN 8)

This schedule is to be used from January 1, 2006 through December 31, 2006, (reference ARM 42.21.140).

The following schedules will be used to arrive at market value when assessing a drill rig.

YEAR	TRENDED % GOOD
2006	100%
2005	92%
2004	91%
2003	85%
2002	76%
2001	66%
2000	57%
1999	41%
1998	35%
1997	29%
1996 and older	24%

Not sure should be in Manual

DEPTH CATEGORIES AND REPLACEMENT COST NEW

Manufactures Depth Rating	Electrical R.C.N.	Mechanical R.C.N.
0 - 3,000		285,209
3,001 - 5,000		432,135
5,001 - 7,500	868,250	654,750
7,501 - 10,000	1,167,210	998,750
10,001 - 12,500	1,265,500	1,130,600
12,501 - 15,000	1,720,400	1,538,500
15,001 - 20,000	1,990,100	
20,001 & Over	2,036,047	

Property Type	Class Code	Property Class	Taxable Percentage
Drill Rigs	6520	8	3%

DRILL RIG VALUATION INSTRUCTIONS

It is the responsibility of the taxpayer to certify to you the manufactured year of the rig, the manufacturer's depth rating and whether the rig is mechanical or electrical.

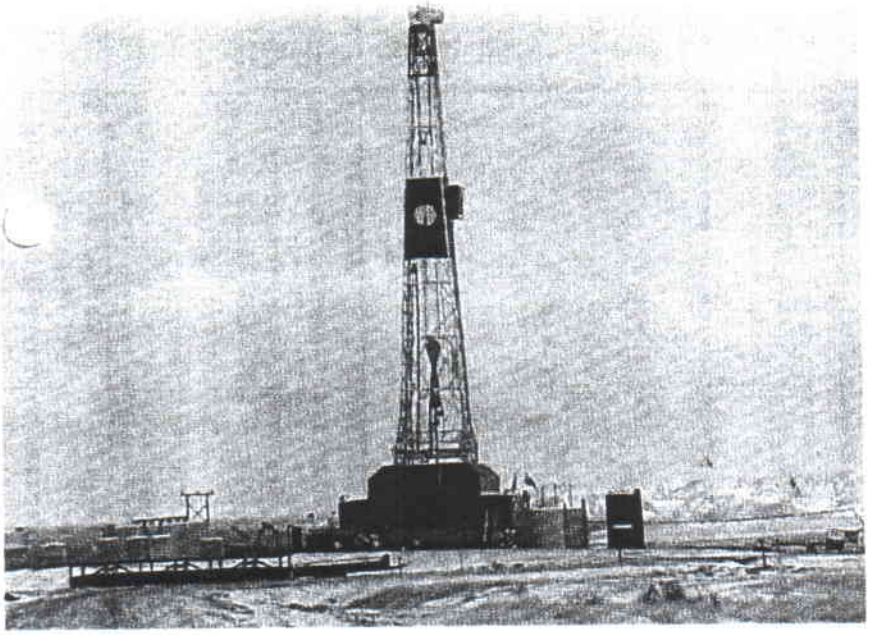
COMPUTATION

The replacement cost new (R.C.N.) is determined by the manufacturer's depth rating. Once the replacement cost new is determined, you would apply the "Trended % Good" to that figure to determine the market value. The percentage to be used will be determined by the year manufactured.

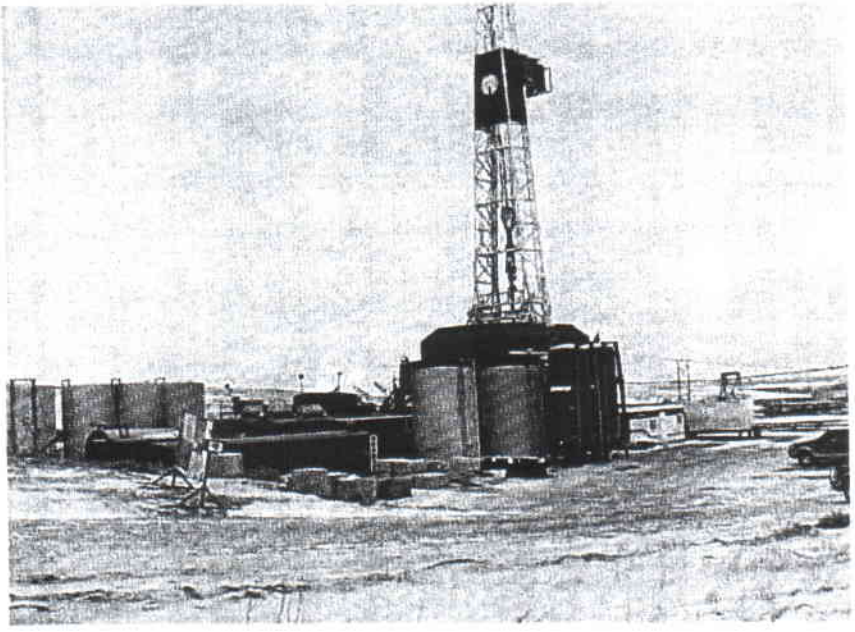
EXAMPLE: The taxpayer has a mechanical drill rig manufactured in 1984 with a manufacturer's depth rating of 8,500. Using the schedules the R.C.N. is $998,750. The "% good" is 23%.

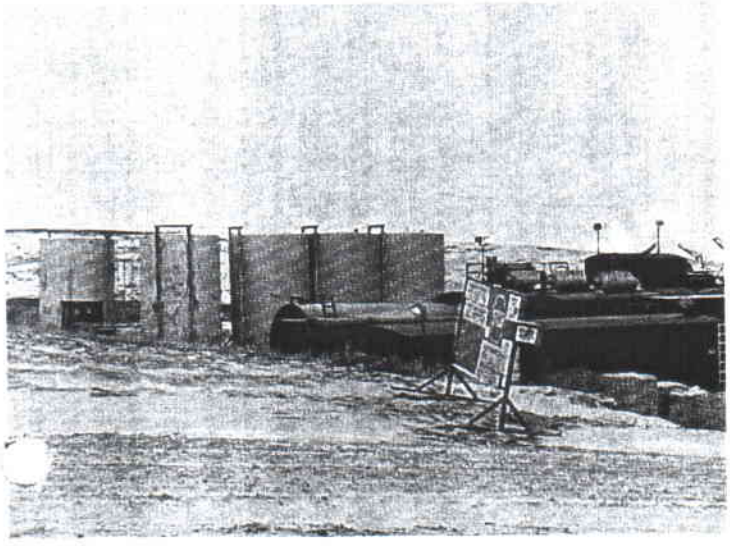
998,750 x 24% = 239,700 = market value
239,700 x 3% = 7,191 = taxable value

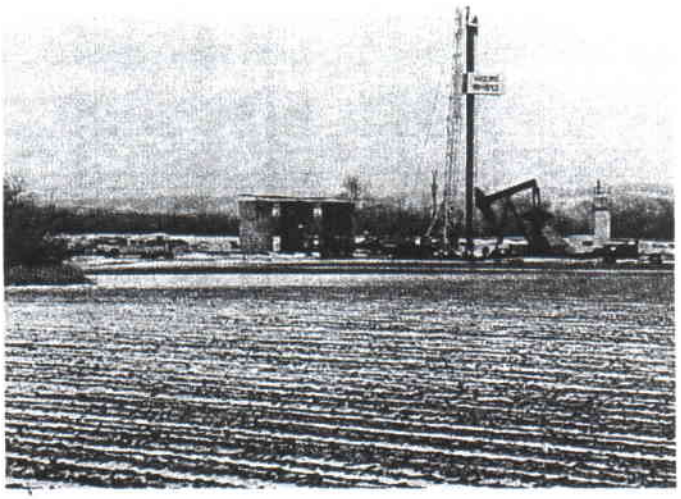
NOTE: **IF YOU HAVE ANY QUESTIONS CONCERNING THE ASSESSMENT OF THIS TYPE OF PROPERTY, CONTACT A SPECIALIST IN HELENA.**

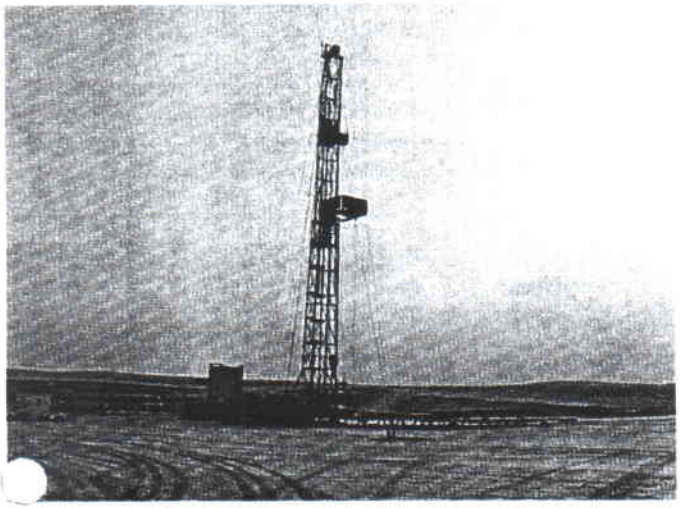


Drilling Rig

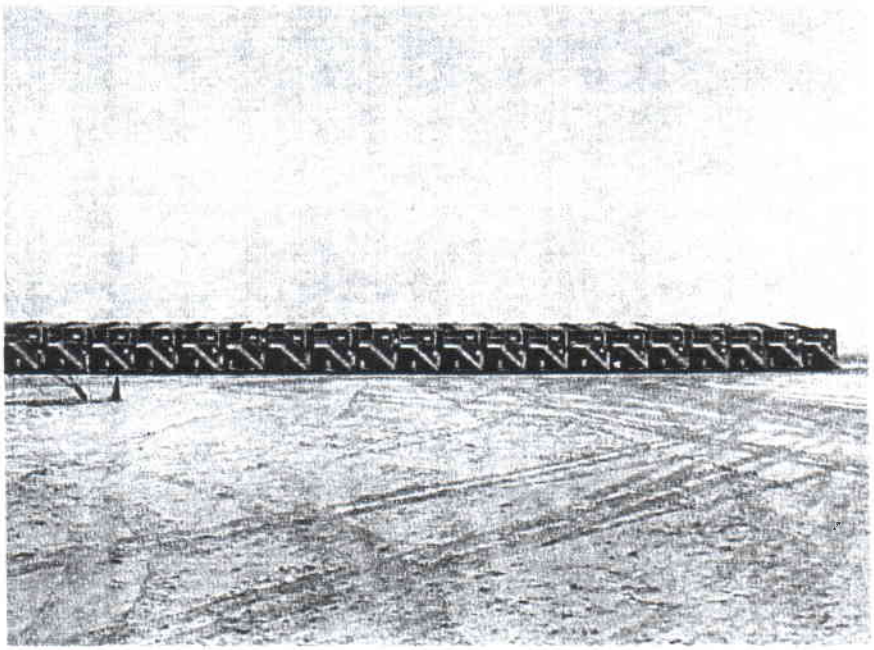






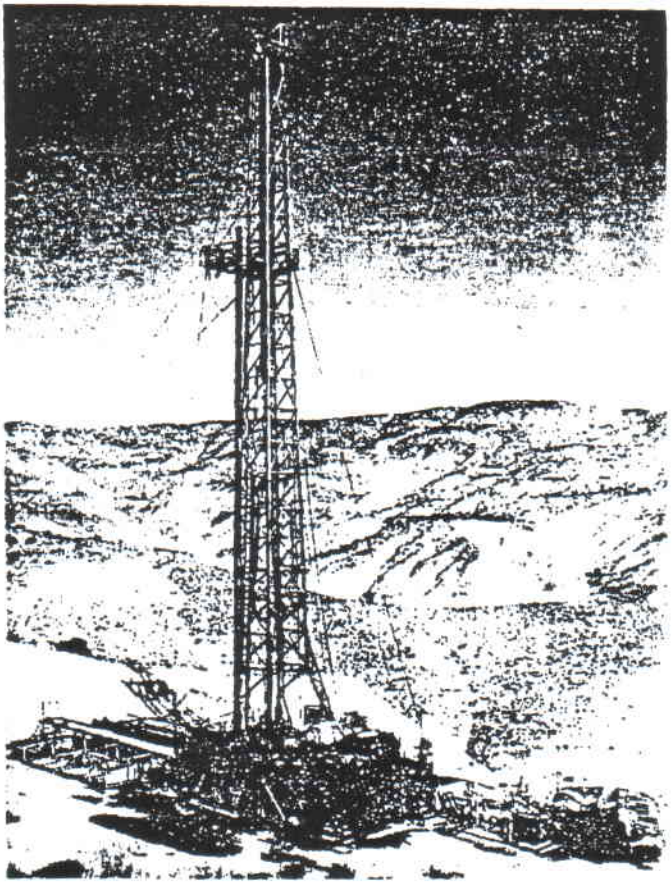


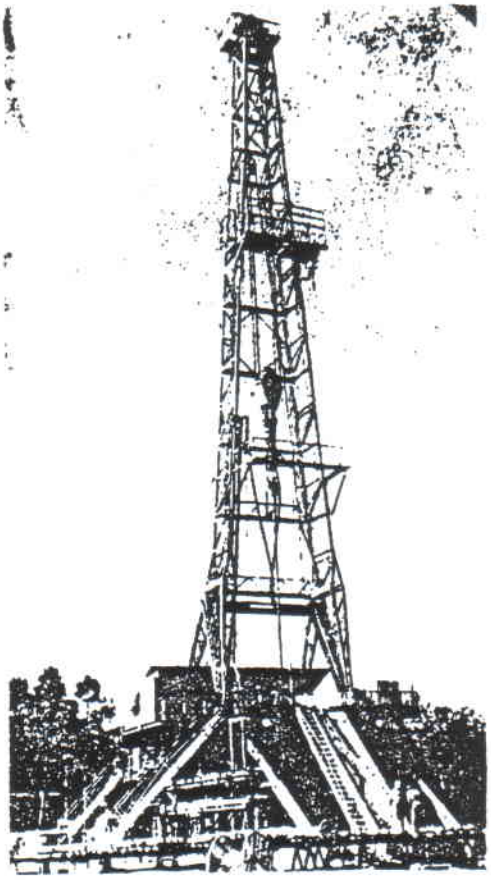
Service and Workover Rigs



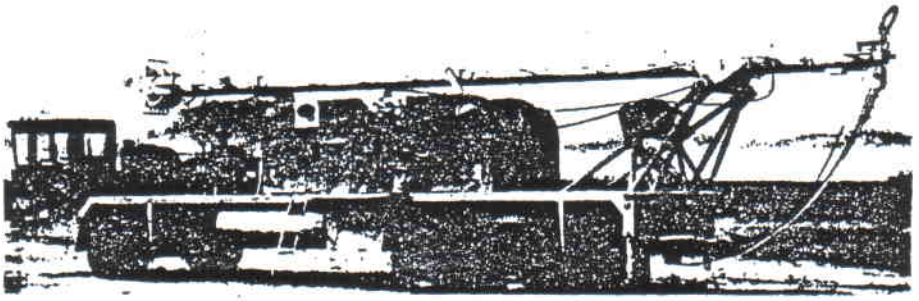
Mobile tanks used when flow testing wells. They are licensed as trailers through the Treasurer.

WELL DRILLING RIGS

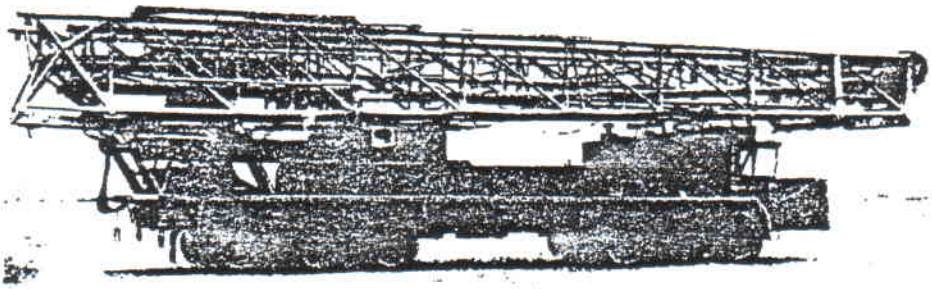




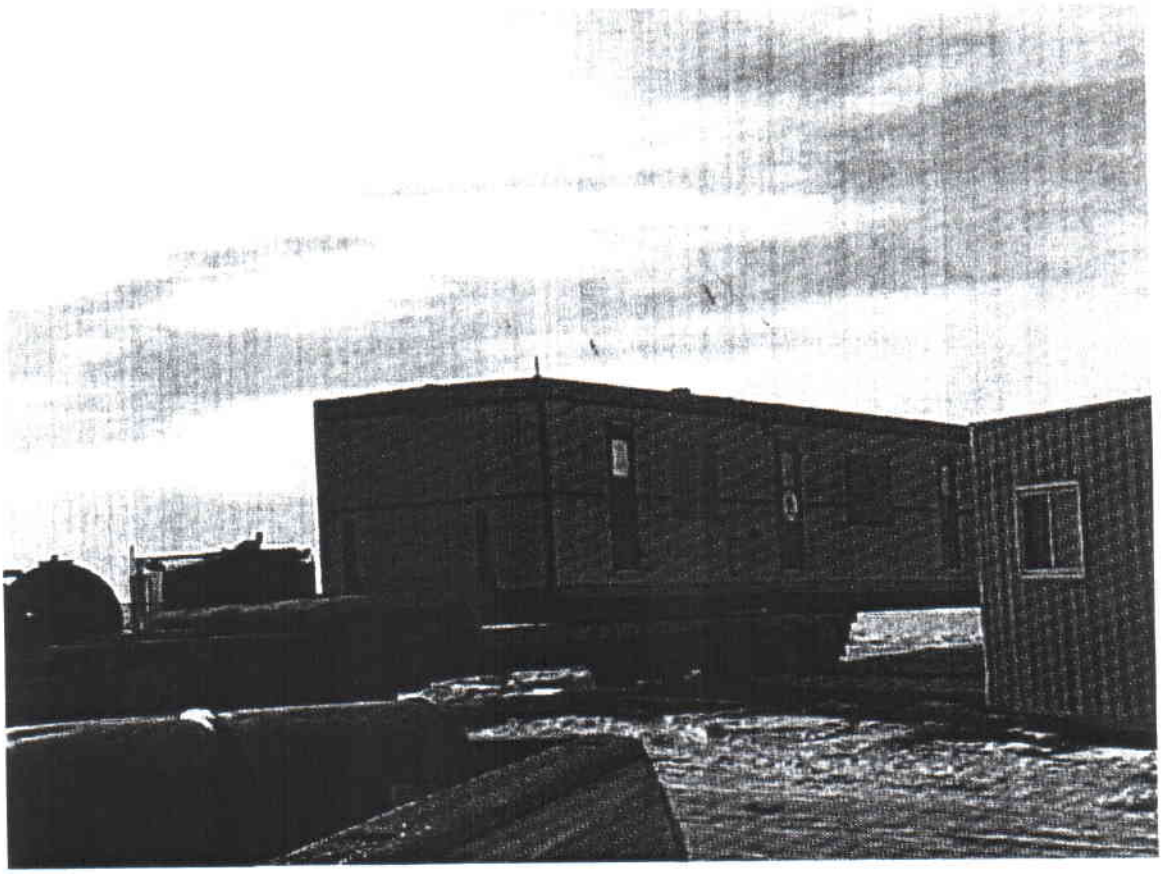
PORTABLE SKID MOUNTED RIGS



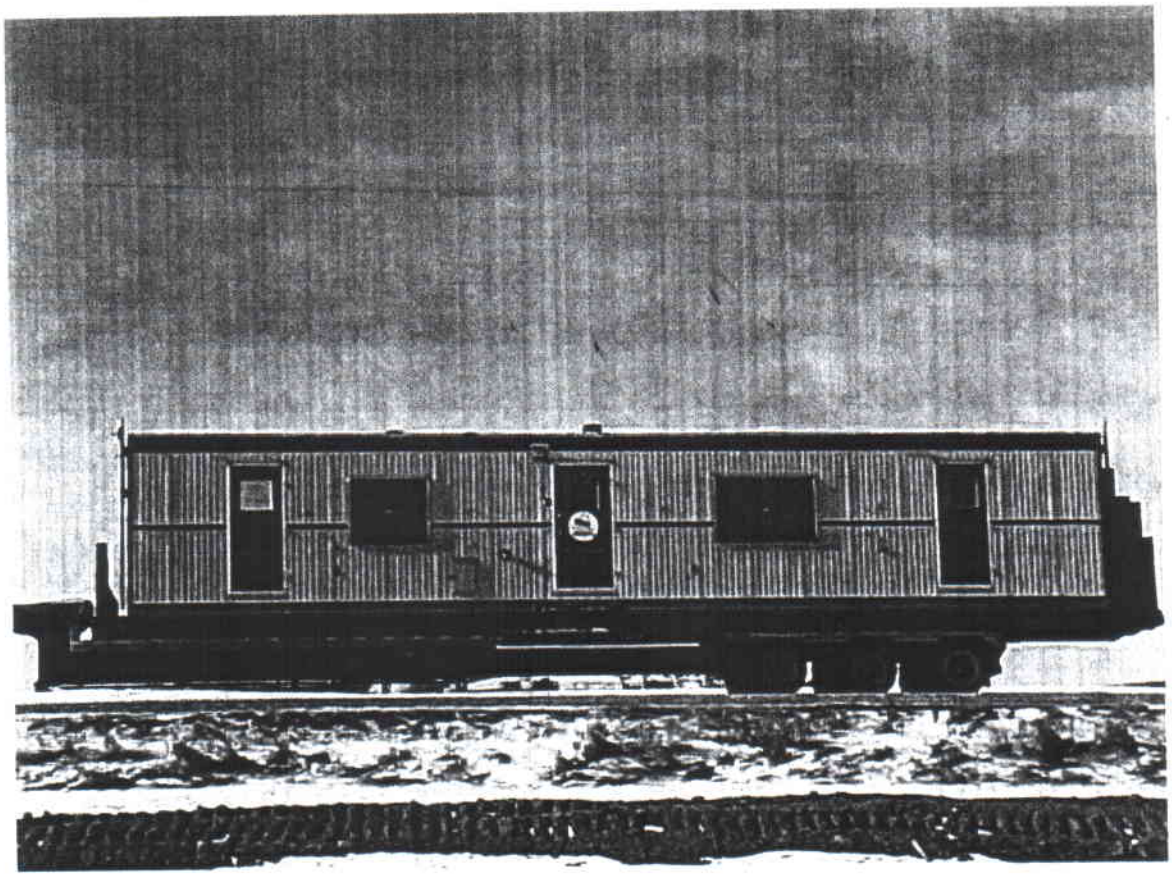
SERVICING RIG



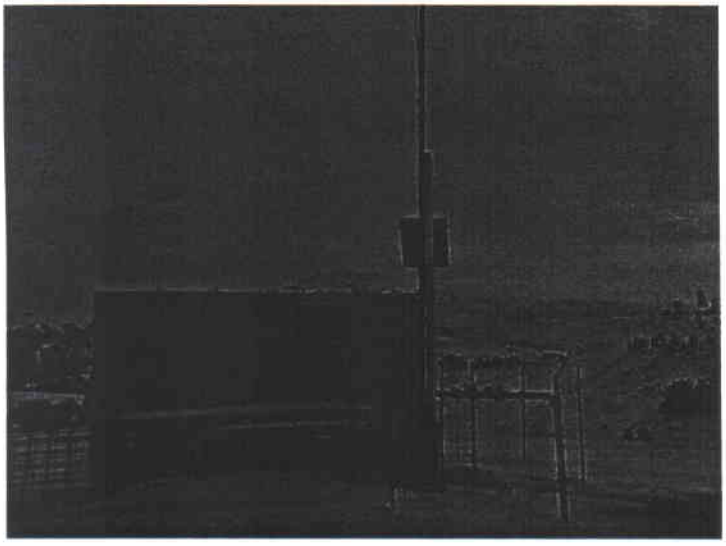
WORKOVER RIG



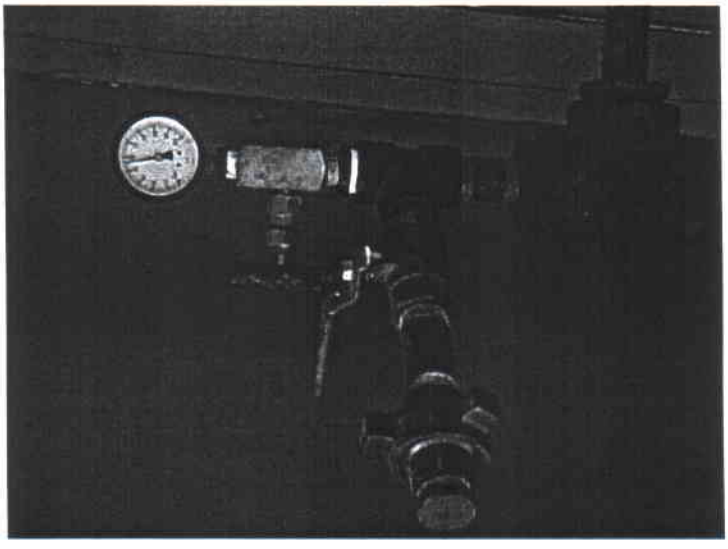
WISCO trailer on skids, office doghouse leased to rigs



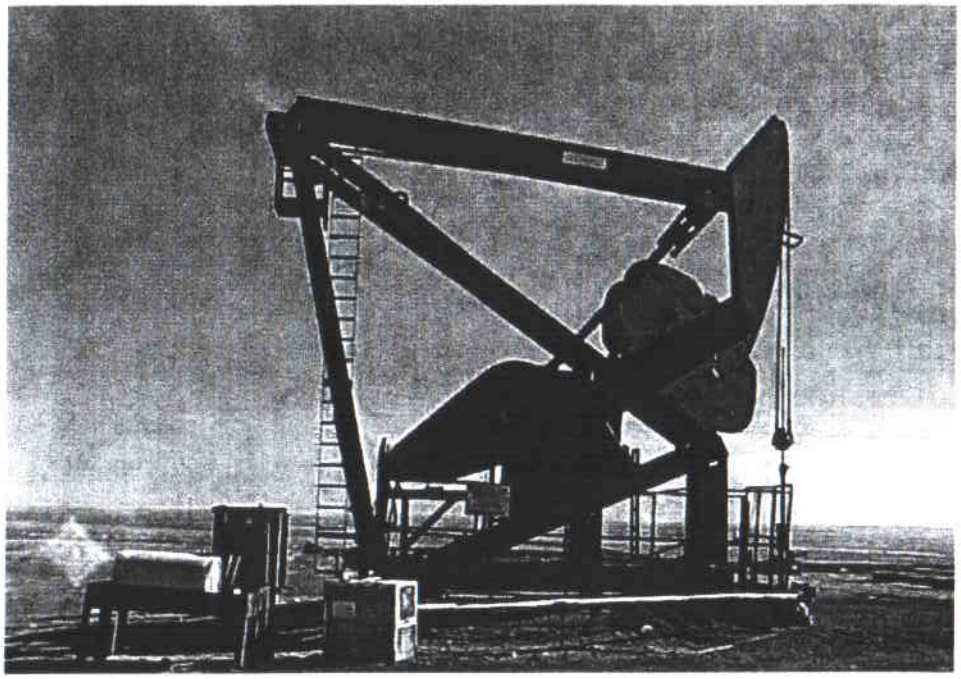
Gas Wells

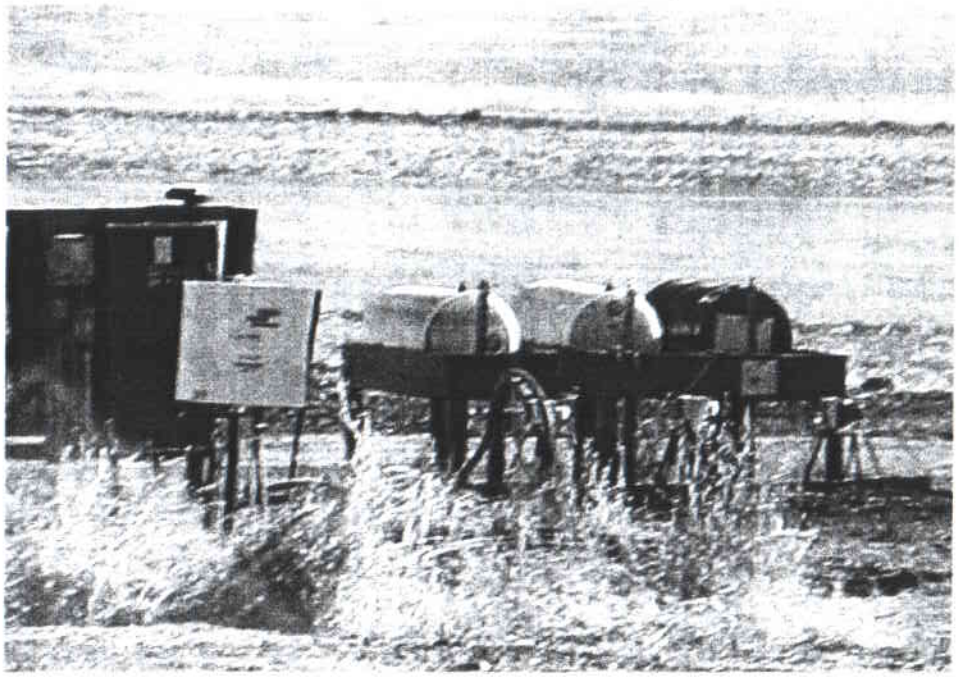


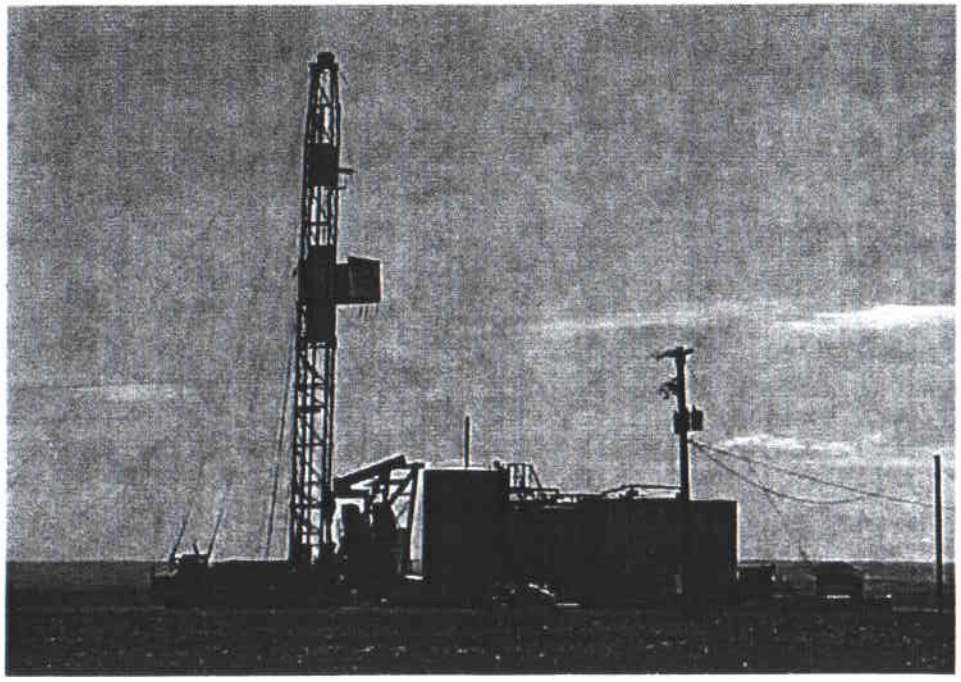
Meter Shed

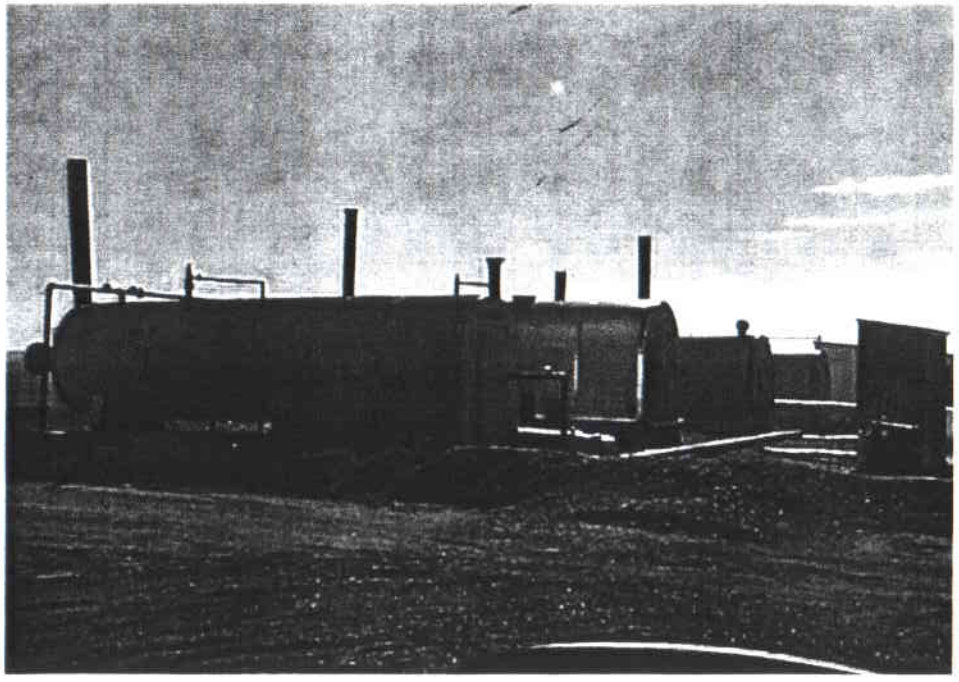


Metering Equipment





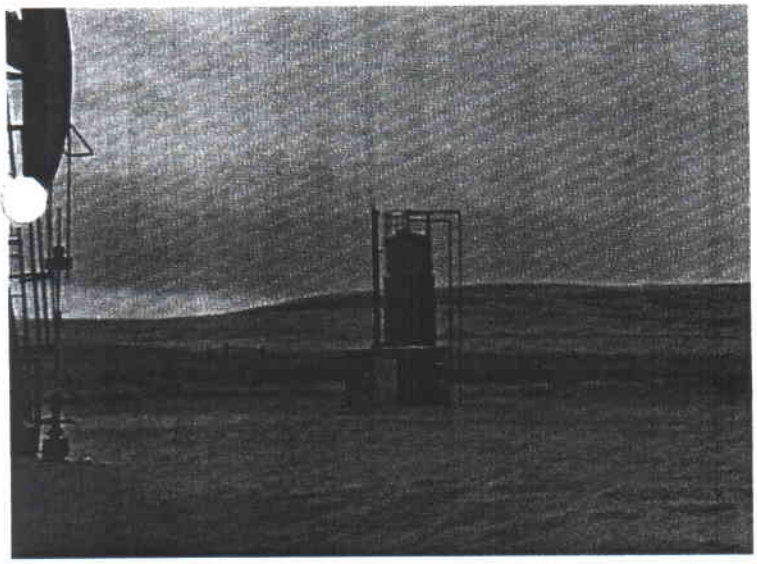




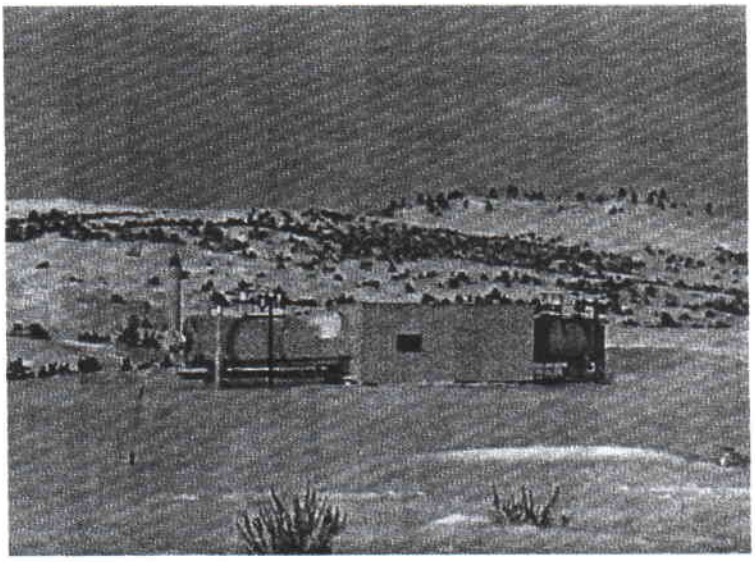
Oil Well Site

Pumping Unit

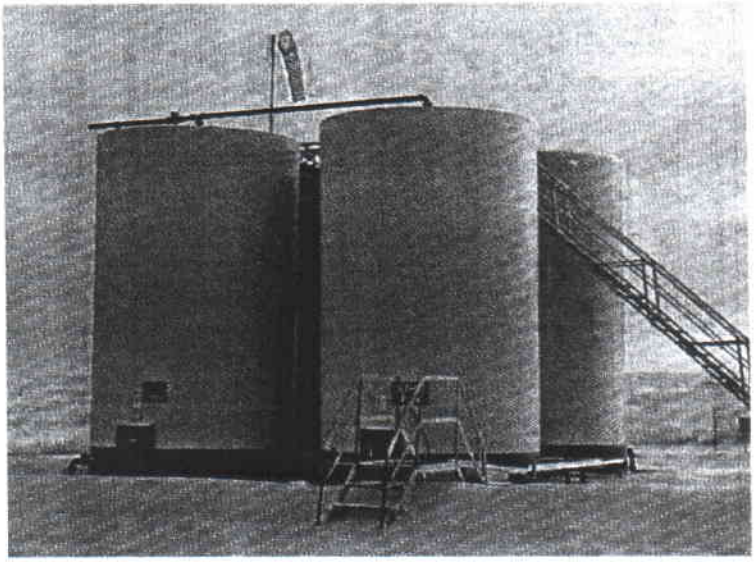
Vertical Treater

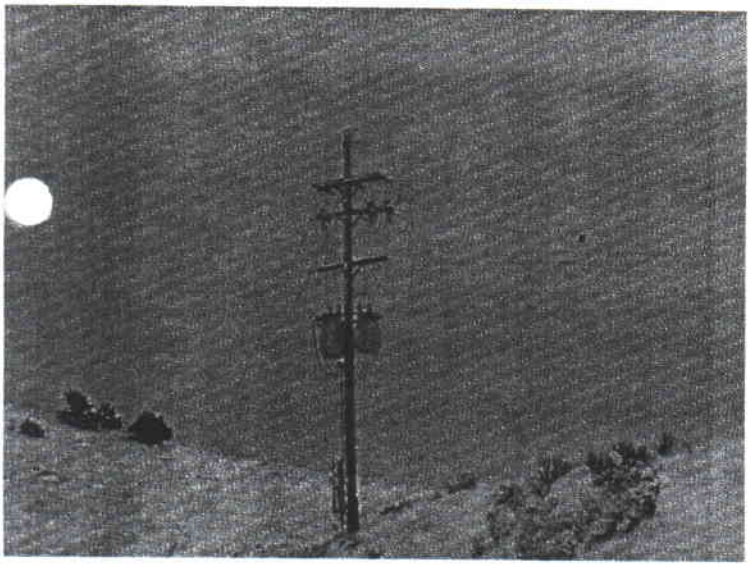


Horizontal Treater

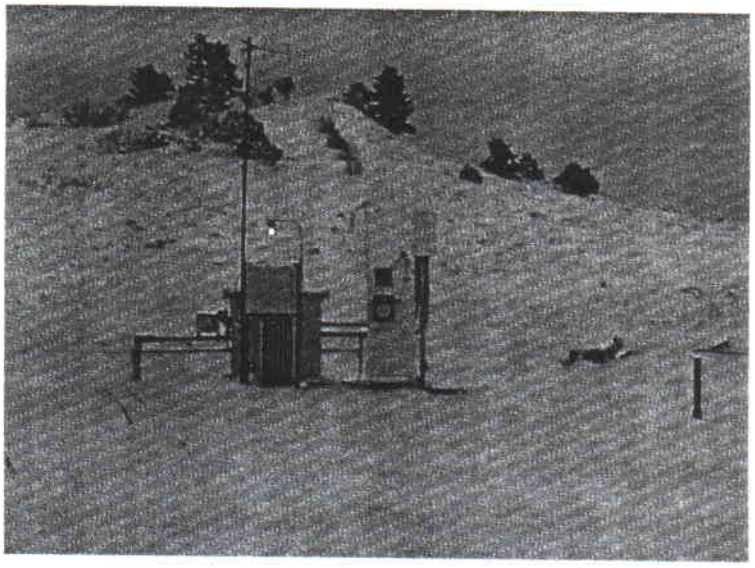


Salt Water
And
Crude
Tanks

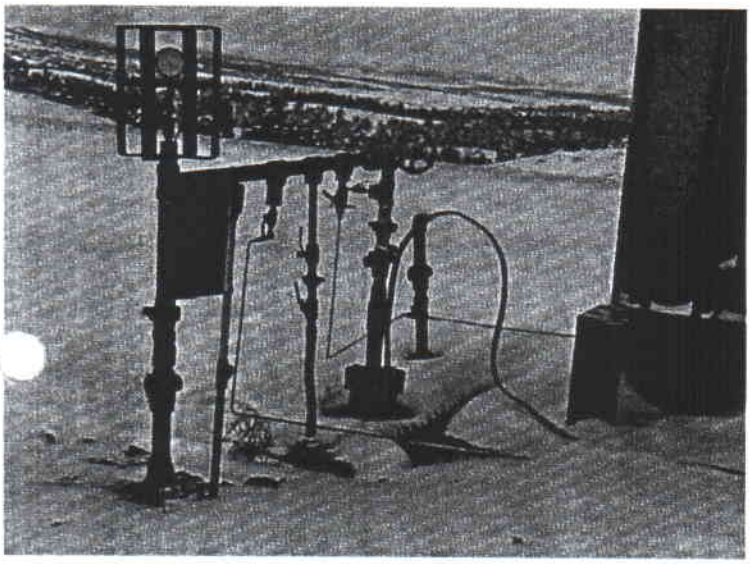




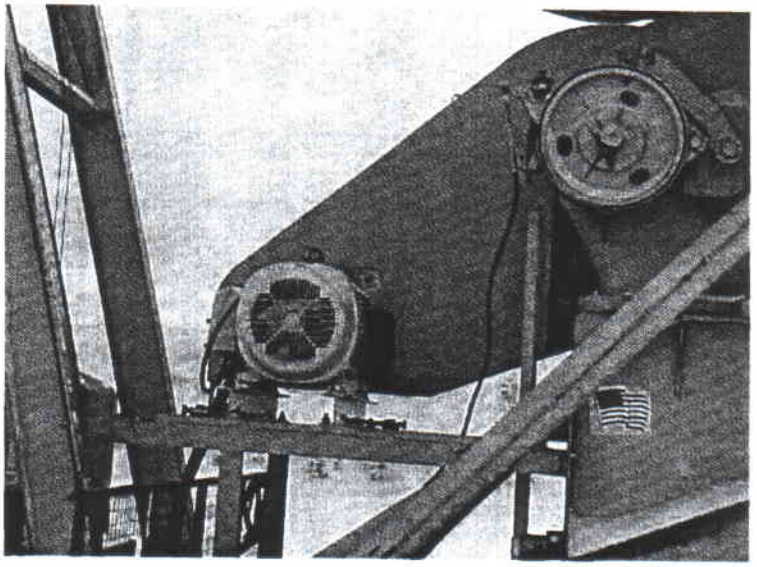
Transformers



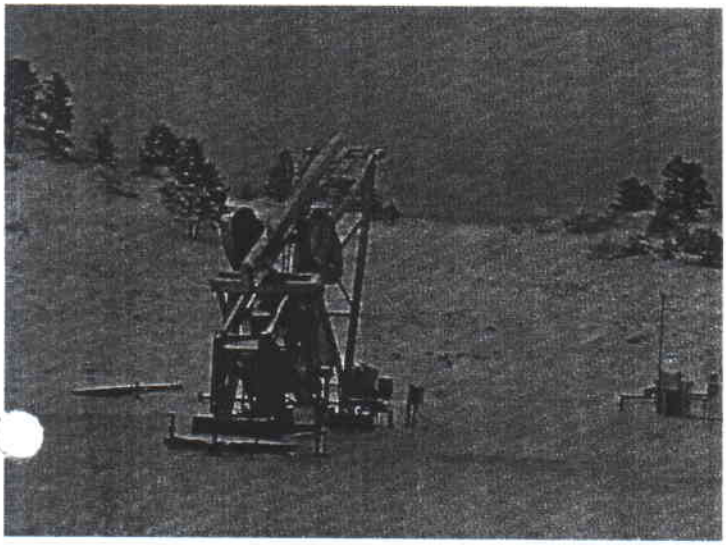
Electric Box



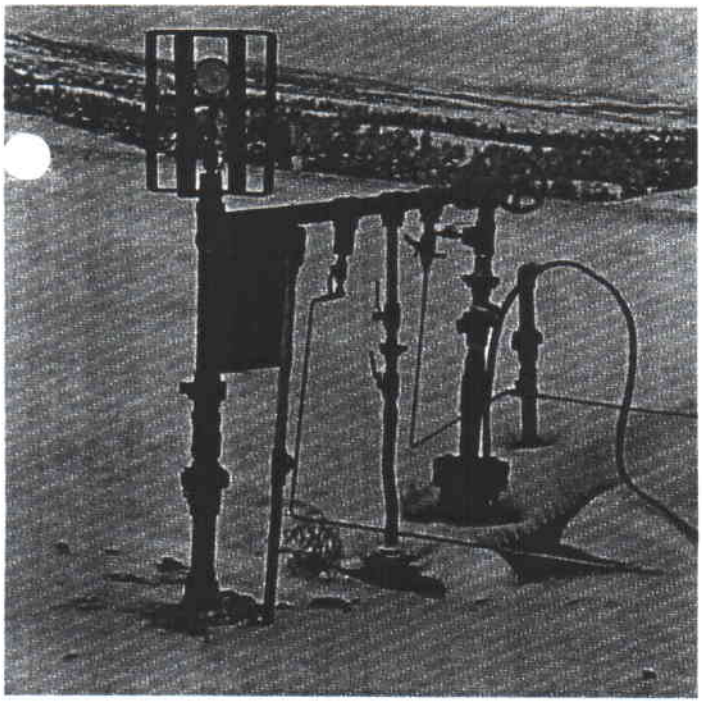
Head Equipment



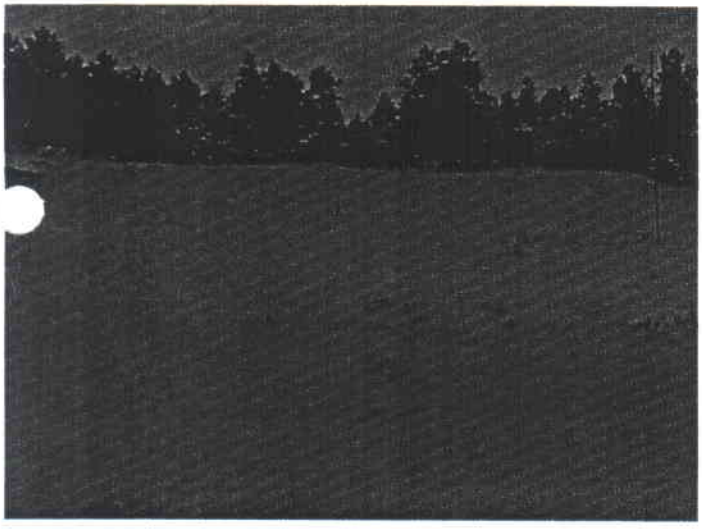
Motor



Pumping
Unit



Temporarily Abandoned Well (TA)
Well Head and Cement Only



Plugged and Abandoned Well (PA)
Everything Gone

2. DRILL PIPE AND TOOL JOINTS

The major portion of the drill string or drill column is composed of drill pipe. The drill pipe most commonly used has an average length of thirty (30) feet.

The individual lengths of pipe are fastened together by means of tool joints. The male half is flash welded to one end of an individual piece of pipe and the female half to the other end. This means that there are tool joints at thirty (30) foot intervals throughout the length of the drill string.

Drill pipe and tool joints cost are included in the values for skid mounted rotary rigs Section V, page 2, item 1A.

Use the following to value drill pipe in storage:

	O.D. Size	Wt.Ft. Lbs.	Grade	R.C.N. Per Ft.
A.	2-3/8"	6.65	E	$12.60
B.	2-7/8"	10.40	E	15.50
C.	3"		E	20.82
D.	3-1/2"	13.30	E	24.36
E.	4"	14.00	E	27.74
F.	4-1/2"	16.60	E	30.28
G.	5"	19.50	E	35.19

SECTION VI

PIPELINES AND RELATED EQUIPMENT

PIPELINES AND RELATED EQUIPMENT

GENERAL

The pipeline costs listed in this manual pertain to gathering lines and main or trunk transmission lines. Flow line costs are listed in Section IV, page 34.

Pipeline costs are listed by diameter of pipe, and both per foot and per mile costs are given. They represent the average current installed replacement cost new of the various sizes of pipelines. The costs apply to all gathering and trunk pipelines regardless of the product they carry, the material they are constructed from or the fact that the pipe is buried below ground or anchored in some manner above ground. Pipeline costs include the pipe, miscellaneous valves, couplings, and connectors, but do not include booster stations or pipeline storage tanks.

Packaged gas compressor booster station and pipeline storage tank costs are listed separately in this section. However, costs for gas processing plants and fluid pump booster stations are not listed in this manual.

PHYSICAL INVENTORY OF THE PROPERTY

The valuation of a pipeline necessitates an accurate inventory. To install a pipeline, a company must have accurate surveys, maps and other documents. A copy of the necessary maps and documents showing the sizes, locations, and lengths of the pipeline within the county should be obtained.

The inventory listing should be made by referring to these maps and documents, and by a physical inspection and measurement where warranted. As new or extension pipelines and related equipment are installed, they should be inspected and listed the same as all other real and personal property.

1. Installed Pipeline Valuation

When a complete inventory of the property has been made, the replacement cost new of the pipeline can be determined by referring to Table 1 below. Longer pipelines will generally be valued by the mile. Either columns may be used. However, the per mile costs are rounded and will not be quite as accurate as the per foot costs.

Pipeline costs include the pipe, miscellaneous values, couplings and connectors, but do not include booster stations or pipeline storage tanks.

INSTALLED PIPELINE

	Diameter	R.C.N. Per Foot	R.C.N. Per Mile
A.	2" I.D.	$ 5.15	$ 27,059
B.	3" I.D.	7.16	37,794
C.	4" I.D.	8.40	44,425
D.	6" I.D.	12.35	65,351
E.	8" I.D.	15.86	83,745
F.	10" I.D.	20.23	106,724
G.	12" I.D.	24.96	131,731
H.	14" O.D.	31.71	167,473
I.	16" O.D.	36.14	190,972
J.	18" O.D.	44.49	234,877
K.	20" O.D.	51.17	270,116
L.	22" O.D.	56.32	297,176
M.	24" O.D.	60.45	319,125
N.	26" O.D.	66.65	351,810
O.	30" O.D.	87.61	462,596
P.	36" O.D.	103.44	546,378

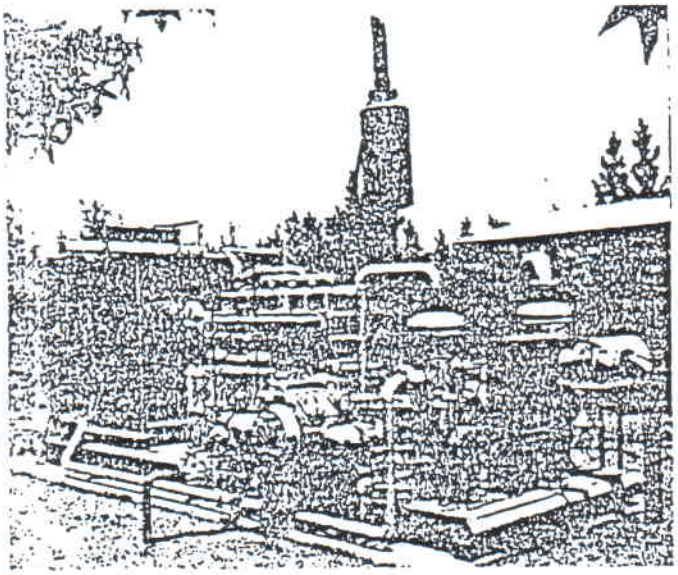
2. Stored Pipe

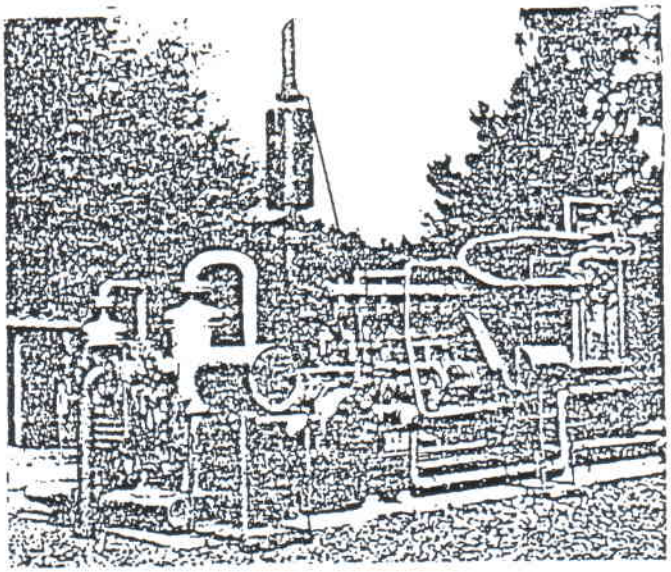
Stored Pipe R.C.N. Per Foot

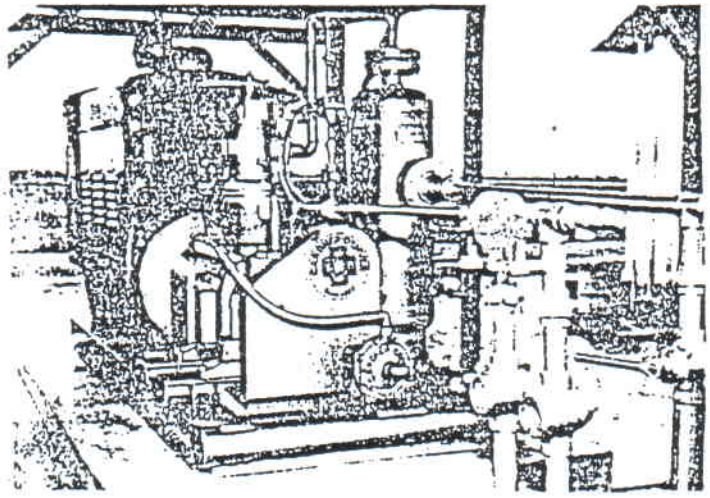
Diameter	Pipe	Coating	Total
2" I.D.	$ 3.19	$.14	$ 3.33
3" I.D.	4.90	.14	5.04
4" I.D.	5.03	.14	5.16
6" I.D.	8.52	.21	8.73
8" I.D.	12.48	.27	12.76
10" I.D.	14.43	.34	14.78
12" I.D.	18.69	.41	19.09
14" O.D.	24.79	.45	25.23
16" O.D.	28.45	.51	28.96
18" O.D.	32.88	.55	33.43
20" O.D.	35.66	.61	36.29
22" O.D.	39.33	.70	40.03
24" O.D.	42.06	.76	42.82
26" O.D.	45.72	.81	46.54
30" O.D.	60.57	.95	61.52
36" O.D.	73.52	1.03	74.55

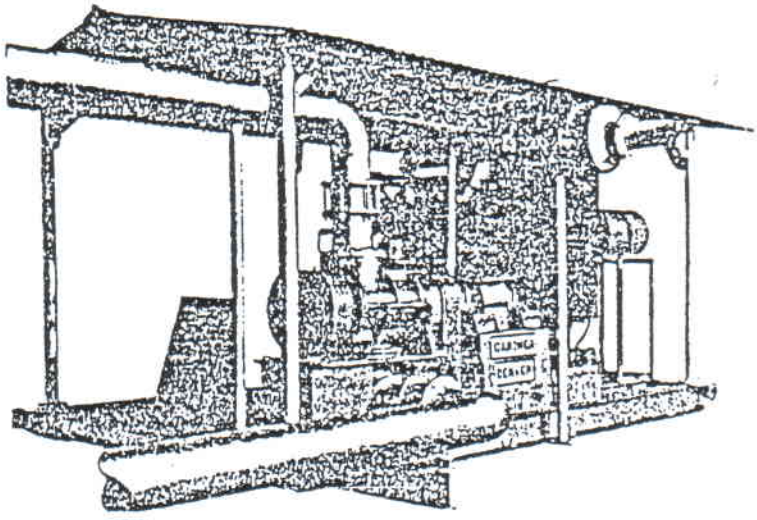
For unwrapped or uncoated pipe, use only the pipe cost.

PACKAGED GAS COMPRESSORS









3. Packaged Gas Compressor Booster Stations

Gas compressors are often required for boosting gas from the wells through the gathering lines, and may be required at intervals along the main pipeline.

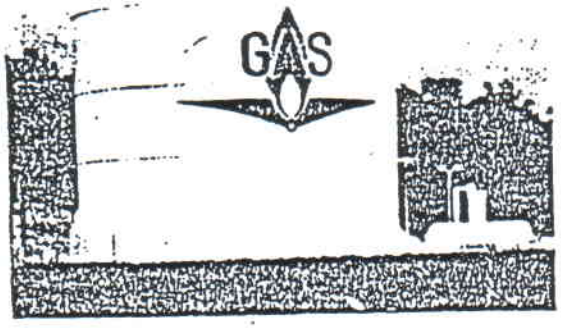
The costs listed below are for compressor stations which are assembled and sold as a package. Most of these units are driven by natural gas engines, but diesel engine and electric motor drives are also found. Costs are for complete packaged gas compressor units and include compressor, the engine or electric motor which drives it, and all necessary gas scrubbers, piping, valves, skids, etc.

Costs are based on the horse power rating of the compressor, not the engine which drives it. This horse power rating is usually listed on the name plate of the compressor.

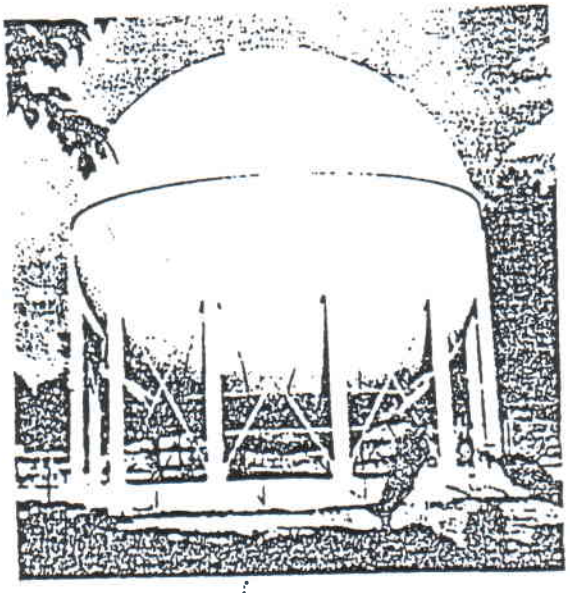
	Compressor H.P. Rating		R.C.N. Per H.P.
A.	Up to 50	Reciproc. Comp.	$1,160
B.	Up to 50	Rotary Comp.	1,586
C.	51 - 100		1,082
D.	101 - 200		834
E.	201 - 500		734
F.	501 - 1000		544
G.	1001 - 2000		503

Put behind Sect 4 pg 3

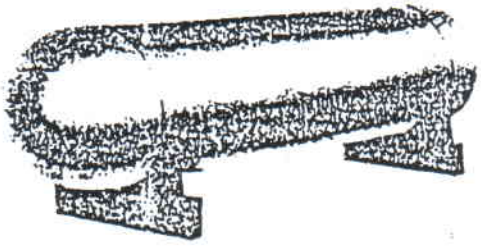
PETROLEUM STORAGE TANKS



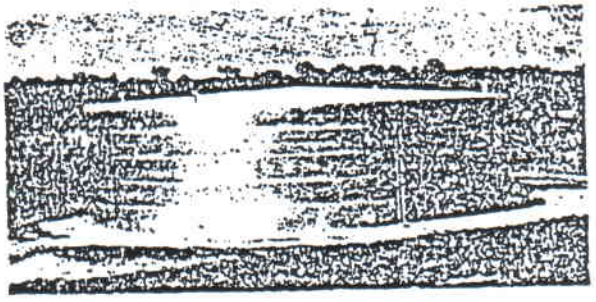
HEMISPHEROID PRESSURE TANK



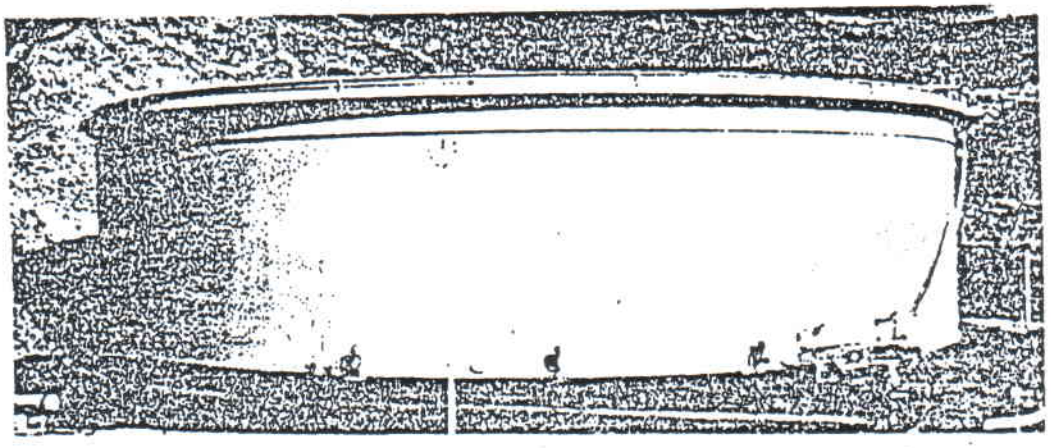
SPHERE PRESSURE TANK



HORIZONTAL PRESSURE TANK



FIXED ROOF OIL STORAGE TANK



FLOATING ROOF OIL STORAGE TANK

ELECTRICAL

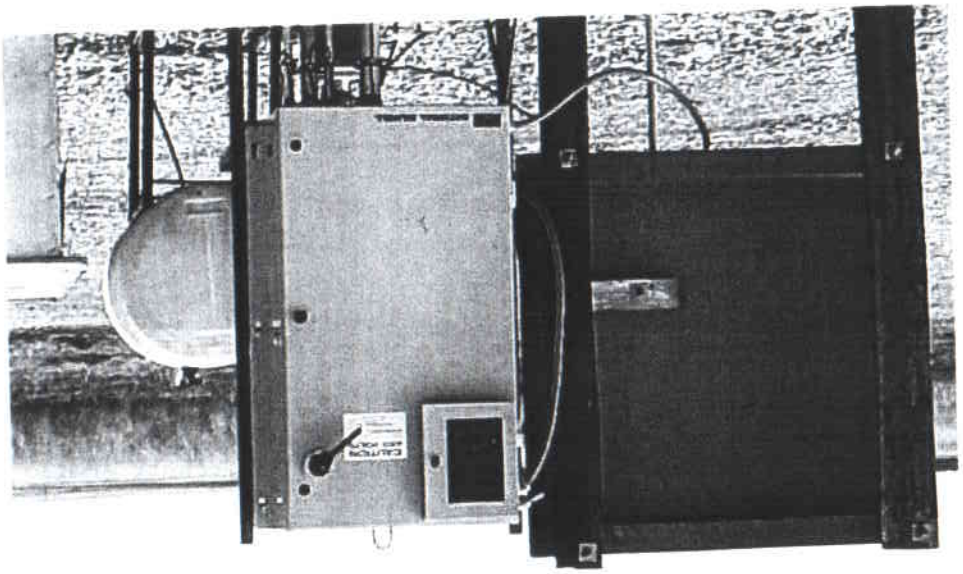
TOWERS

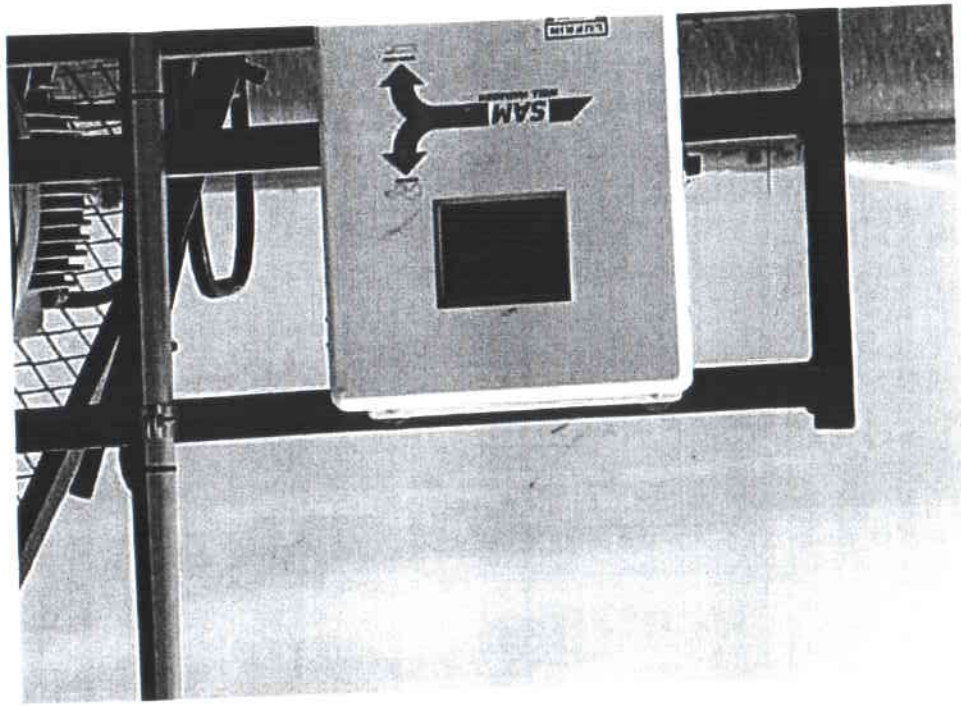
GPS UNIT (RADIOCONTROL)

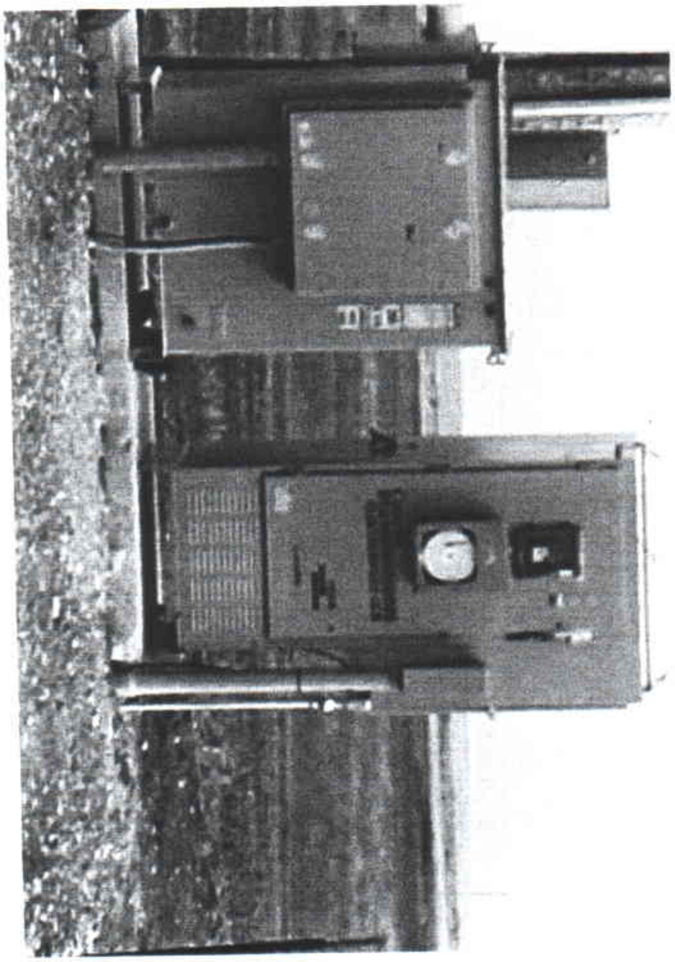
TRANSFORMERS

ELECTRICAL BOXES

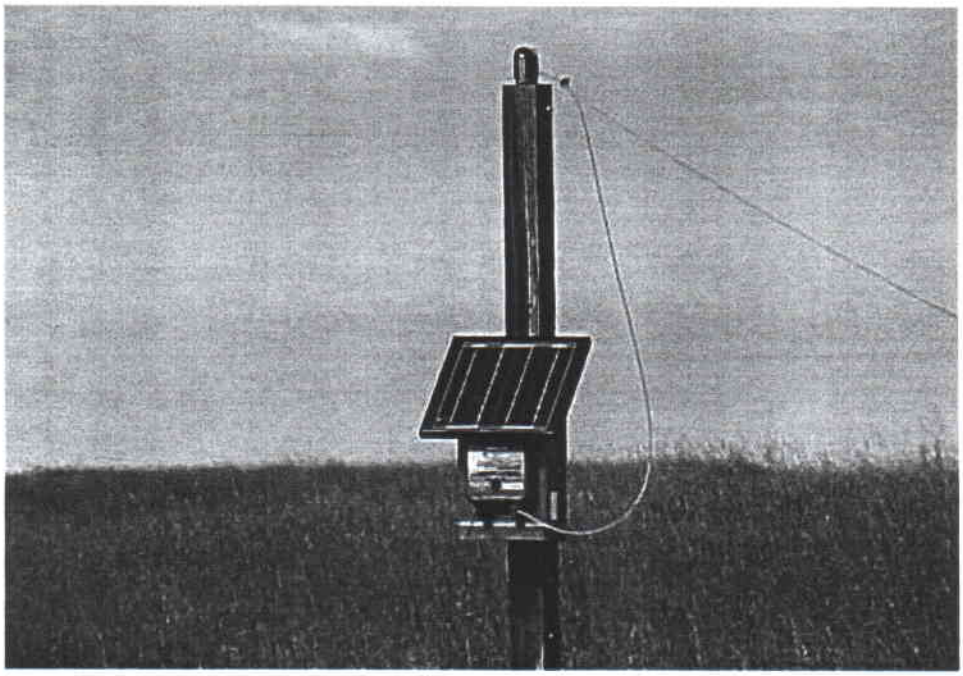
CONTROL PANELS

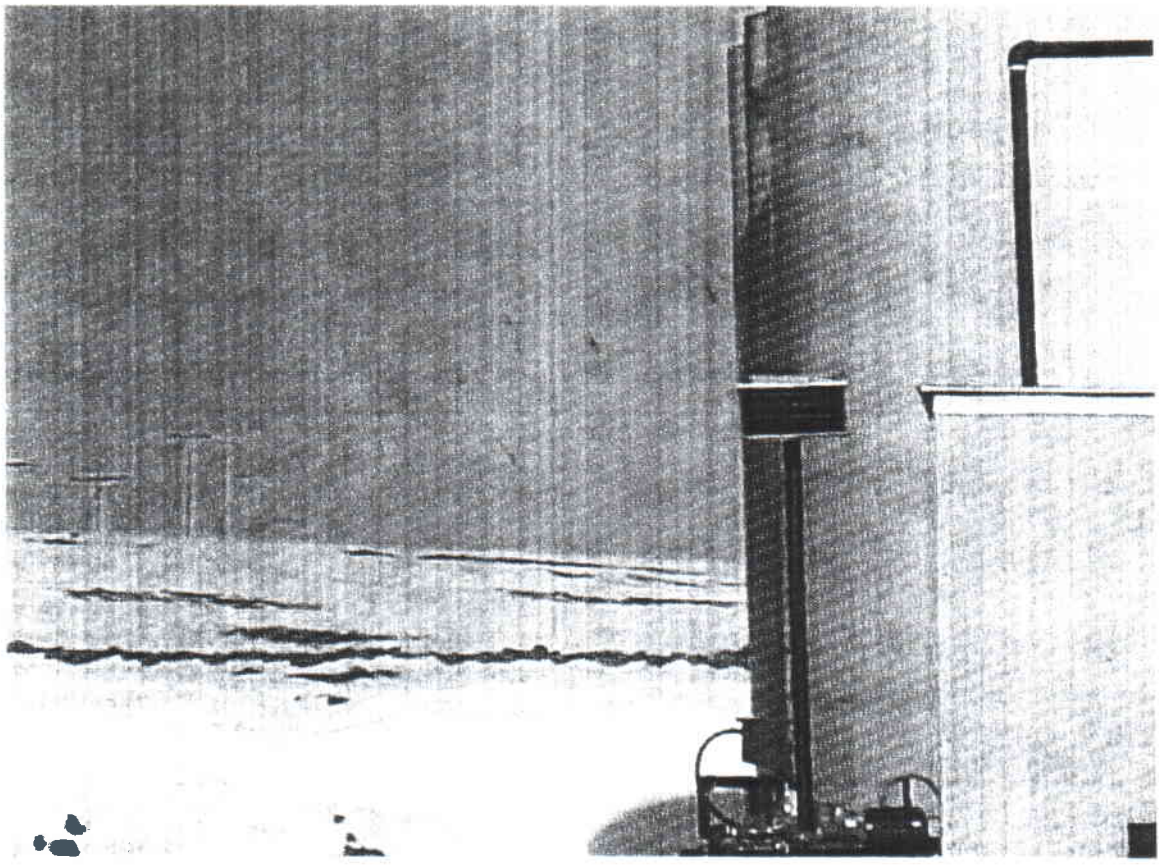



SAM

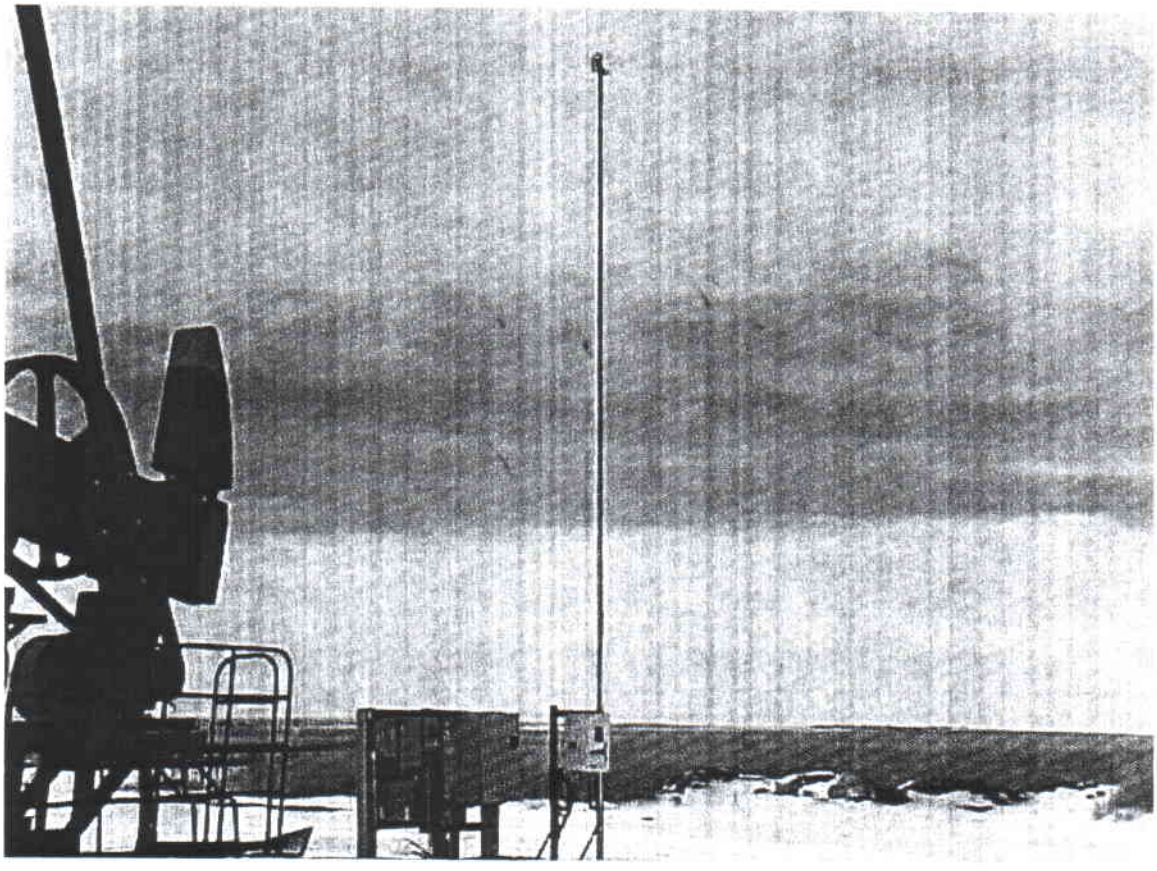



BAKER
HUGHES
Centrilift
DANGER
HIGH VOLTAGE
KEEP OUT
CAN WEST

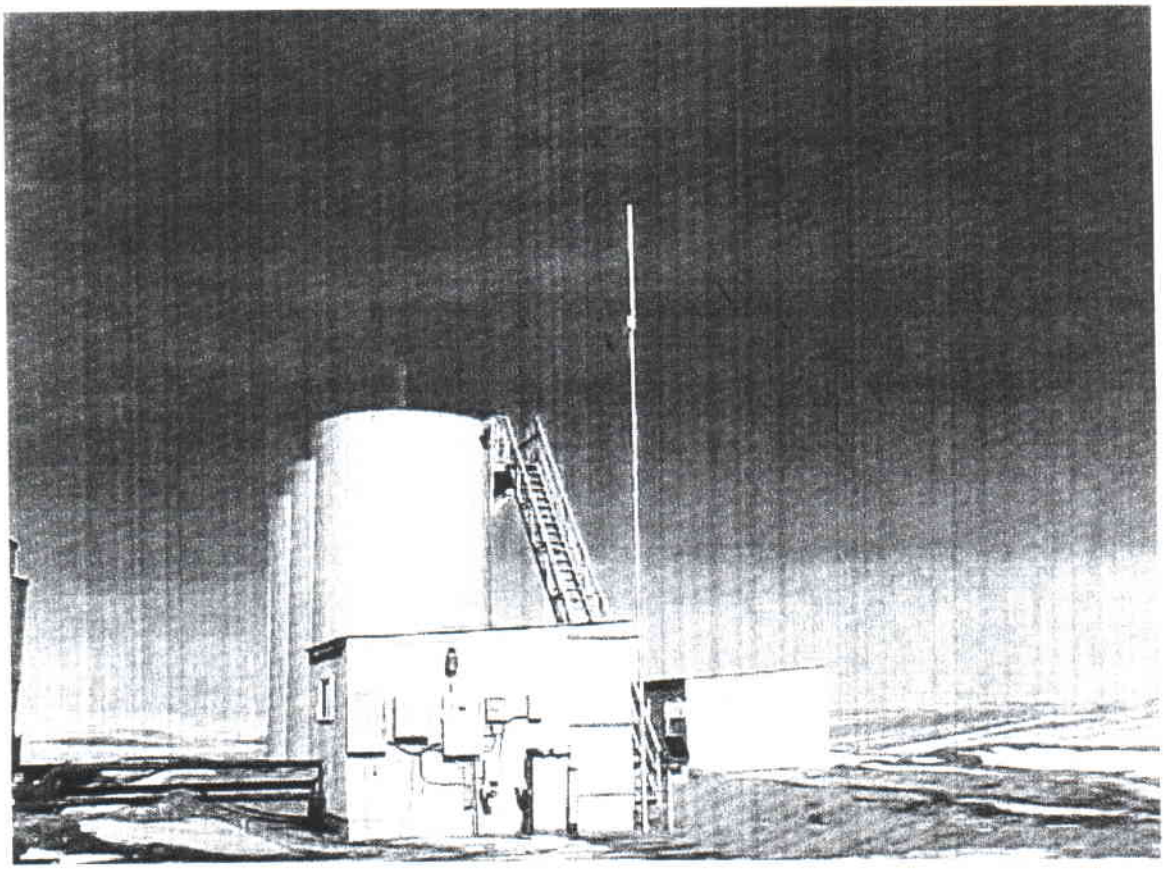




Solar Igniter



Tower for meter that switches P.U. on and off - this connected to computer system and can be read in Midland, TX at anytime.



Tower – most probably GPS

SECTION VII

GLOSSARY

GLOSSARY

WELLS

OIL WELL – A well, the principle production of which at the mouth of the well is oil.

GAS WELL – A well, the principle production of which at the mouth of the well is natural gas.

FLOWING WELL – An oil well with enough pressure to lift the oil to the surface without a pump. Sometimes called "Flush Well".

ABANDONED WELL – A once producing well that has been permanently plugged with cement, usually because its production has dropped to a point where extraction is not profitable.

SHUT IN WELL – A gas well or oil well, the control valves of which have been closed so that no oil or gas is produced. Wells are often shut in until economics justify extending a pipeline to their location.

SERVICE WELL or INJECTION WELL – A well which is drilled for, or converted for the purpose of injecting liquids or gas into an underground formation in order to increase pressure, forcing the oil toward the producing wells, or for disposal of salt water.

OTHER TERMS

ACT – "Automatic Custody Transfer", a system in the trunkline of a pipeline for automatically measuring and sampling oil or products at points of receipt of delivery other than leases.

BARREL – 42 U.S. Gallons at 60° F. at atmospheric pressure.

BOOSTER STATION – A station in a pipeline whose function is to receive oil through a main pipeline and to transmit it to the next station. It receives no oil from any other source nor does it have a tank farm.

BS&W	-	Basic sediment and water. Generally pipeline regulation limits the contents of HS&W to 1 percent of the volume of oil.
CHRISTMAS TREE	-	The well-head equipment consisting of casing and tubing heads, valves, chokes, gauges, and pipe which leads to the flow lines.
DEHYDRATOR	-	A device, usually dual cylinder, which removes moisture or water vapor from natural gas.
DRY HOLE	-	A well drilled that fails to produce oil or gas in commercial quantities.
FLOATING ROOF	-	A roof which rests on the surface of the oil contained in a tank rather than on structural members. It rises and falls with the level of liquid in the tank.
FLOW LINES	-	Small diameter pipes through which crude oil or gas flows form the well head to treating and separating equipment, tanks, and the sludge pit.
GATHERING LINE	-	A pipeline usually of small diameter used in gathering crude oil form the oil field to a point on a main pipeline.
LACT STATION	-	"Lease Automatic Custody Transfer" station; an automated system for measuring and transferring oil from a lease gathering system into a pipeline.
MAIN LINE	-	A truck pipeline or main transmission line.
PRIMARY RECOVERY	-	The recovery of oil by utilizing the natural energy of the oil reservoir. In this phase, oil is recovered by utilizing the gas pressure of the reservoir to move oil to the well bore and then to the surface. This is usually augmented by mechanical pumping.

SECONDARY RECOVERY - Any process of artificially supplying energy to an oil reservoir to implement the recovery of additional oil. Usually water or gas is injected into the producing formation to flush out the oil and carry it to the well bores of the producing wells.

SEPARATOR - A cylindrical device which separates natural gas from crude oil.

TANK BATTERY - A group of 2 or more tanks to which crude oil flows from producing oil wells.

TERTIARY RECOVERY - Any process of recovering additional oil which was not recoverable by waterflood or gasflood methods. It is sometimes accomplished by introducing very expensive chemicals into the producing formation.

TREATER - A device which separates water, BS&W, and natural gas from crude oil.

UNITIZED OIL PROPERTY - An operation, typically run by one operator, for the benefit of all participants, both lessors and lessees, to the end that the greatest possible volume of oil and gas can be recovered under the most economical condition. Unit operations generally involve some of secondary recovery. Unitized fields also generally have centralized collection stations, each of which serves a cluster of wells near it. These collection stations treat, process, and temporarily store the products produced by the wells they serve.

WATERFLOOD - The injection of water by means of an injection well into and through the producing formation to the well bores of producing wells. This is the most common form of secondary recovery.

ABBREVIATIONS

ACT	-	Automatic Custody
API	-	American Petroleum Institute
APIG	-	American Petroleum Institute Specific Gravity
BBL (bbl)	-	Barrel
BBL (bbl) H (h)	-	Barrels Per Hour
BBL (bbl) D (d)	-	Barrels Per Day
BTU	-	British Thermal Unit
BTUH (h)	-	British Thermal Unit Per Hours
H.P.	-	Horse Power
I.D.	-	Inside Diameter
LACT	-	Lease Automatic Custody Transfer
L.F.	-	Lineal Feet
MCF	-	Thousand Cubic Feet - 1,000 c.f.
MMCF	-	Million Cubic Feet - 1,000,000 c.f.
O.D.	-	Outside Diameter
PSI	-	Pound Per Square Inch